June 29, 2006

Ms. Alexis Strauss
Attn: Greg Arthur (WTR-7)
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105

SUBJECT: San Jose/Santa Clara Water Pollution Control Plant 2006 Industrial Waste Discharge Local Limits Update

Dear Ms. Strauss:

The following local limits review report is being submitted in fulfillment of the March 2005 EPA Administrative Order CWA-307-9-05-06 Finding 2, to submit a technical evaluation by June 30, 2006, of the adequacy of local limits to protect the Plant, collection system, and sewer workers and to ensure that NPDES permit limits are met.

The City of San Jose (City), as lead agency of a Joint Powers Authority, operates the San Jose/Santa Clara Water Pollution Control Plant (Plant) and its pretreatment program. The Plant meets all effluent limitations and maintains, on average, an industrial discharger compliance rate of over 95 percent with federal limits and over 90 percent with the more stringent local limits for the past decade. The last comprehensive technical evaluation of industrial local limits was conducted in 1994 using USEPA guidance from 1987. An important consequence of the 1994 evaluation was the finding that the approach to allocate copper and nickel maximum available headwork's loading (MAHL) to residential, commercial, and industrial sectors was not feasible and an alternative method to derive local limits was developed. For copper and nickel, the City uses a tiered approach that is complicated and very time intensive to manage. The approach was appropriate a decade ago, but is no longer necessary due to effective pretreatment and pollution prevention programs along with business sector changes. This local limits review provides an opportunity to modify the local limits for copper and nickel while ensuring that Plant effluent limits are met and beneficial uses in the South Bay are protected. The City used the 2004 USEPA *Local Limits Development Guidance Manual* for reviewing the adequacy of current local limits, recommending changes where needed.
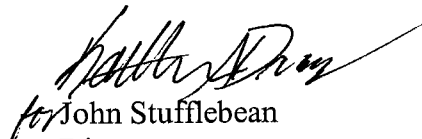
The City recommends that local limits for copper and nickel be modified from a complex three-tiered approach using a combination of mass equivalent concentrations or daily and monthly concentration limits to a two-tier approach of protective maximum allowable concentration limits. The review also indicates that the current local limits for xylene and manganese are no longer necessary and should be discontinued. Xylene will still be included in the list of total toxic organics but not as a separate limitation and the current

selenium limit will be reduced by half. All other remaining local limits are adequate and do not require modification. No other pollutants of concern were found to require further local limits review.

This report is being submitted to both USEPA and the San Francisco Bay Regional Water Quality Control Board for approval. In accordance with Section 101(e) of the Clean Water Act, the City will wait for the control authority to publish a notice and begin the public review process or for direction to begin the process ourselves. Once the proposed local limits changes are approved and public comments addressed, the City will propose changes to its sewer use ordinance and submit the changes to the City Council and then the tributary agencies for final adoption.

The City looks forward to working with USEPA staff to move this process forward. Please contact David Tucker at 408-277-5695 if you have questions about the report.

Sincerely,

for John Stufflebean
    Director

2006 Industrial Waste Discharge Local Limits Update

Prepared by

**City of San Jose
Environmental Services Department
Watershed Protection**

June 2006

Executive Summary

The City of San Jose (City), as lead agency of a Joint Powers Authority, operates the San Jose/Santa Clara Water Pollution Control Plant (Plant) and its pretreatment program. The Plant treats wastewater from over 300 square miles of service area serving approximately 1.4 million residents and 16,000 businesses. The Plant meets all NPDES Permit effluent limitations and has maintained, on average, an industrial discharger compliance rate of >95 percent with federal limits and >90 percent with the more stringent local limits for the past decade. The following local limits review report is in fulfillment of the EPA Administrative Order CWA-307-9-05-06 Finding 2, to submit a technical evaluation of the adequacy of local limits to protect the Plant, collection system, and sewer workers and to ensure that NPDES permit limits are met.

Local Limits Evaluation

The last comprehensive technical evaluation of industrial local limits was conducted in 1994 using USEPA guidance from 1987. An important consequence of the 1994 evaluation was the finding that the approach to allocate copper and nickel maximum available headwork's loading (MAHL) to residential, commercial, and industrial sectors was not feasible and an alternative method to derive local limits was developed. For copper and nickel, the City uses a tiered approach, that is complicated and very time intensive to manage. The approach was appropriate a decade ago, but is no longer necessary due to effective pretreatment and pollution prevention programs and business sector changes. This local limits review provides an opportunity to simplify the local limits for copper and nickel while ensuring that Plant effluent limits are met and beneficial uses in the South Bay are protected. The City used the 2004 USEPA *Local Limits Development Guidance Manual* for reviewing the adequacy of current local limits, recommending changes where needed.

Recommendations

The City recommends that local limits for copper and nickel be simplified from a three-tiered approach to a single protective maximum allowable concentration limit. For copper, a concentration limit of 2.0 mg/L is recommended for permitted dischargers greater than 1,000 gallons per day (gpd). For those industrial dischargers with a discharge of less than 1,000 gallons per day, the existing maximum allowable concentration limit of 2.7 mg/L for copper is retained. For nickel, the recommended concentration limit is 0.5 mg/L for dischargers greater than 1,000 gpd. For industrial dischargers with a discharge of less than 1,000 gpd, the existing maximum allowable concentration limit of 2.6 mg/L is retained.

The review indicates that the current local limits for xylene and manganese are no longer necessary and should be discontinued. Xylene will still be included in the list of total toxic organics but no longer needs a separate limitation. The current selenium limit of 2.0 mg/L will be reduced to 1.0 mg/L as a maximum allowable concentration limit. All other remaining local limits are adequate and do not require modification. No other pollutants of concern were found to require further local limits review.

Next Steps

This report is being submitted to both EPA and the San Francisco Bay Regional Water Quality Control Board for approval. In accordance with Section 101(e) of the Clean Water Act, the City will wait for the control authority to publish a notice and begin the public review process or for direction to begin the process ourselves. Once the proposed local limits changes are approved and public comments addressed, the City will propose changes to its sewer use ordinance and submit the changes to the City Council and then the tributary agencies for final adoption.

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Acronyms

µg/L	micrograms per liter
AHL	allowable headworks loading
BNR	biological nutrient removal
BOD	biological oxygen demand
CDD	chlorinated dioxin
City	City of San Jose
CTR	California Toxics Rule
DEHP	di-ethylhexl phthalate
ft^2	square feet
gal/ft^2/d	gallons per square feet per day
IAHL	industrial allowable headworks loading
MAHL	maximum allowable headworks loading
MAIL	maximum allowable industrial loading
MAS	mass audit study
MECL	mass equivalent concentration limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mgd	million gallons per day
MR	probability plotting
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity unit
OSHA	Occupational Safety and Health Administration
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
Plant	San Jose/Santa Clara Water Pollution Control Plant
POC	pollutants of concern
POTW	publicly-owned treatment works

ppd	pounds per day
ppm	parts per million
RCMP	Reasonable Control Measures Plan
ROS	regression order statistic
RPA	Plant's 2003 reasonable potential analysis
SLI	starting lighting ignition
STLC	soluble threshold limit concentration
TCDD	tetrachlorodibenzodioxin
TSS	total suspended solids
TTLC	total threshold limit concentrations
TTO	total toxic organics
USEPA	United States Environmental Protection Agency
Water Board	San Francisco Bay Regional Water Quality Control Board

1.0 Introduction

This report presents the City of San Jose's (City) evaluation of existing local limits to determine if modifications to these controls are needed to maintain compliance with regulatory requirements applicable to the San Jose/Santa Clara Water Pollution Control Plant (Plant), to protect worker health and safety and to safeguard Plant and collection system infrastructure. Additional factors that were considered in the assessment of the City's existing local limits included special National Pollutant Discharge Elimination System (NPDES) and pretreatment permitting requirements and industrial pretreatment program improvement objectives. The evaluation process was based on the maximum allowable headworks loading (MAHL) method described in the July 2004 United States Environmental Protection Agency (USEPA) *Local Limits Development Guidance Manual* (2004 USEPA Guidance Manual).

The local limits evaluation process prescribed in the 2004 USEPA Guidance Manual is a mass-based approach. First, potential pollutants of concern (POCs) are established based on regulatory and operational requirements. Next, POC allowable headworks loadings (AHL) that achieve regulatory and operational requirements are calculated based on Plant performance data. The minimum AHL for each POC is the POC's MAHL. Finally, for each POC, the ratio of MAHL to the Plant's actual influent loading is compared with 2004 USEPA Guidance Manual criteria to determine whether new local limits should be promulgated for POCs that are not currently regulated and whether existing local limits should be modified. Note that the "anti-backsliding" concept associated with NPDES permits does not apply to local limits.[1] Local limits may be modified to be more or less stringent or eliminated entirely based on the results of the evaluation.

For each POC requiring a new or revised local limit, the maximum allowable industrial loading (MAIL) is determined by subtracting Plant residential and commercial loadings from the MAHL. The MAIL for each POC is then allocated among regulated industrial users to establish the POC's local limit. The traditional approach to allocate the MAIL among regulated industrial users is to divide the MAIL by the average industrial flow to derive a concentration limit. However, the 2004 USPA Guidance Manual provides for alternative approaches to allocating the MAIL should the need arise. Different POCs may have different allocation methods as described by this evaluation.

1.1 Previous Local Limits Evaluation

The City routinely assesses the effectiveness of its source control program through statistical evaluations of influent, effluent, and biosolids-loading data as described in its annual Industrial User Pretreatment Compliance Reports. In addition, the City must periodically evaluate local limits to ensure that pretreatment and source control activities continue to protect the San Francisco Estuary, the Plant operations, and the wastewater collection

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[1] *EPA Local Limits Development Guidance*, EPA 833-04-002A, United States Environmental Protection Agency, Office of Water Management 4203, July 2004, pg. 9-10

system, as well as comply with state and federal environmental regulations. The last comprehensive technical evaluation of industrial local limits was conducted in 1994. Two reports document the results of the 1994 local limits study:

- City of San Jose Pollution Prevention Strategy for a Clean Bay, Including Proposed Local Limits for Copper, Nickel and Cyanide (October 1994), and

- Evaluation of Local Limits for Non-Regulated Pollutants (December 1994).

The 1994 evaluation was based on the USEPA's *Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program* (1987) and predicated upon the MAHL approach. An important consequence of the 1994 evaluation was the finding that the approach to allocate copper and nickel MAHLs to residential, commercial, and industrial sectors described in the 1987 Guidance Manual was not feasible due to several factors, including:

- The removal rates were based on a very conservative 95 percent confidence interval,

- The relationship between the influent and effluent loading was non-linear and not representative of the traditional method of calculating headworks loading, and

- The NPDES permit contained very stringent interim limits for both nickel and copper.[2]

Therefore, the City developed an innovative approach to develop copper and nickel local limits that included compliance tiers, mass limits, and source control evaluations.

Other notable changes to industrial local limits arising out of the 1994 evaluation included:

- Elimination of numeric limits for barium, boron, fluorides, formaldehydes, ketones, and sulfides,

- Reduction in the beryllium local limit from 1.0 mg/L to 0.75 mg/L,

- Incorporation of the chlorinated hydrocarbons and toluene local limits into a new Total Toxic Organics (TTO) local limit,

- Reduction in the cyanide limit from 1.0 mg/L to 0.5 mg/L, and

- Addition of a local limit for xylene.

1.2 Existing Local Limits

Table 1-1 summarizes the currently applicable maximum allowable concentration limits contained in the City's sewer use ordinance. The tiered approach to local limits for copper and nickel is described in Section 1.2.1.

1.2.1 Existing Copper and Nickel Local Limits

For the purposes of implementing local limits for copper and nickel, the City identifies Group 1 Dischargers as those industries that collectively discharge 85 percent of the

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[2] *Pollution Prevention Strategy for a Clean Bay, Including Proposed Local Limits for Copper, Nickel, and Cyanide*, Montgomery Watson, October 1994, pgs. 2-31

TABLE 1-1 Existing Local Limits	
Constituent	**Maximum Allowable Concentration (mg/L)**
Antimony	5.0
Arsenic	1.0
Beryllium	0.75
Cadmium	0.7
Chromium, Total	1.0
Copper	2.7
Cyanide	0.5
Lead	0.4
Manganese	35.0
Mercury	0.010
Nickel	2.6
Phenol & Derivatives	30
Selenium	2.0
Silver	0.7
TTO	2.13
Xylene	1.5
Zinc	2.6
TTO = total toxic organics.	

industrial copper or nickel loading to the Plant. Industrial dischargers with industrial process flows less than 1,000 gallons per day and which do not use copper or nickel in their manufacturing processes are categorized as Group 3 Dischargers. All other regulated industrial users are categorized as Group 2 Dischargers. The local limits for each of these groups are presented in Table 1-2 below.

1.2.1.1 Group 1 Discharger Limits

Group 1 Dischargers are required to comply with average mass equivalent concentration limits (MECLs). These MECLs are calculated as an average concentration attainable by each industry after implementation of cost-effective pollution prevention measures, as identified in City approved mass audit studies (MASs). The MASs are site-specific and include pollution reduction measures identifying maximum feasible reduction measures to be implemented that have a 5-year-or-less payback period. In addition, discharge from Group 1

Dischargers cannot exceed the maximum instantaneous concentration of 2.7 mg/L for Copper and 2.6 mg/L for Nickel.[3]

TABLE 1-2 Summary of Copper and Nickel Limits for Group 1, 2, and 3 Dischargers[4]			
Pollutant	**Group 1**	**Group 2**	**Group 3**
Copper	Annual average MECLs based on a mass audit study	Option 1: 0.4 mg/L average annual concentration limit	
		or	
		Option 2: 1.0 mg/L daily maximum concentration limit plus reasonable control measures	
	And	and	
	2.7 mg/L maximum allowable concentration limit	2.7 mg/L maximum allowable concentration limit	2.7 mg/L maximum allowable concentration limit
Nickel	Annual average MECLs based on a mass audit study	Option 1: 0.5 mg/L average annual concentration limit	
		or	
		Option 2: 1.1 mg/L daily maximum concentration limit plus reasonable control measures	
	And	And	
	2.6 mg/L maximum allowable concentration limit	2.6 mg/L maximum allowable concentration limit	2.6 mg/L maximum allowable concentration limit
MECL = mass equivalent concentration limits.			

1.2.1.2   Group 2 Discharge Limits

Group 2 Dischargers can either comply with annual average concentration limits of 0.4 mg/L for copper and 0.5 mg/L for nickel, or daily maximum concentration limits of 1.0 mg/L for copper and 1.1 mg/L for nickel. Industries choosing to comply with the daily maximum concentration limits also have to implement designated reasonable control measures. All Group 2 dischargers must comply with maximum allowable instantaneous concentration limits of 2.7 mg/L for copper and 2.6 mg/L for nickel.

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[3] *Pollution Prevention Strategy for a Clean Bay, Including Proposed Local Limits for Copper, Nickel, and Cyanide*, Montgomery Watson, October 1994, pgs. 3-9,11

[4] *Pollution Prevention Strategy for a Clean Bay, Including Proposed Local Limits for Copper, Nickel, and Cyanide*, Montgomery Watson, October 1994, pgs. From Table 3-5, pg. 3-10

1.2.1.3 Group 3 Discharge Limits

Group 3 facilities are identified as small industries that discharge less than 1,000 gallons per day and have no copper or nickel processes. Because the cumulative mass loadings for copper and nickel from these facilities are typically less than 0.5 percent of the total loading to the Plant, Group 3 Dischargers are simply required to comply with the maximum allowable concentration limits of 2.7 mg/L for copper and 2.6 mg/L for nickel. In addition, some facilities are also required to comply with best management practices that were specifically developed by the City for some specialized commercial categories.[5]

Figures 1 and 2 below present recent industrial loading information by discharger group as explained in Section 1.2.1

FIGURE 1-1
Mean Daily Copper Loading by Industrial Gruop
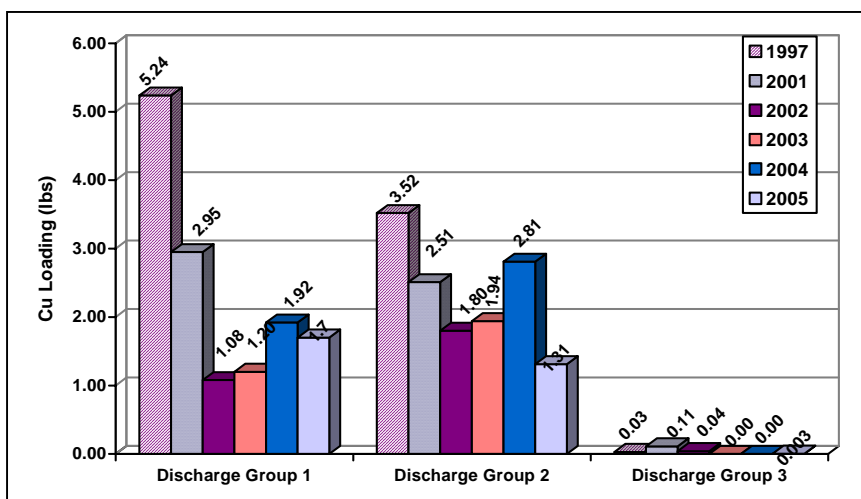
FIGURE 1-2
Mena Daily Nickel Loading by Industrial Group

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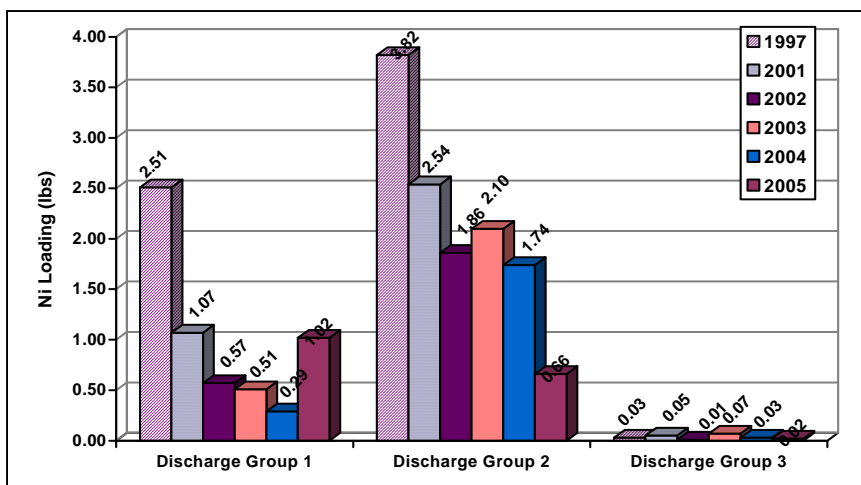
[5] *Pollution Prevention Strategy for a Clean Bay, Including Proposed Local Limits for Copper, Nickel, and Cyanide*, Montgomery Watson, October 1994, pg. 3-26

2.0 The San Jose/Santa Clara Water Pollution Control Plant

The Plant wastewater treatment train comprises the following treatment processes: preliminary treatment, primary treatment, secondary treatment, filtration, disinfection, and disinfectant removal, as shown in Figure 2-1. The Plant treats its primary and secondary sludge prior to disposal through sludge dewatering, anaerobic digestion, and lagoon storage. The Plant also has offline flow equalization basins with a total storage volume of 16-million gallons to store wastewater during peak flow periods. Below is a short description of these treatment processes and facilities.

2.1 Preliminary Treatment

Preliminary treatment consists of four climber bar screens to remove large debris from the raw sewage and two grit removal chambers. Effluent from the grit removal process flows into a raw sewage wet well for pumping into the primary sedimentation tanks.

Raw sewage enters the Plant from San Jose through a 103-inch pipe, from Santa Clara through a 78-inch pipe, and from Milpitas through a 36-inch force main. These lines tie in at the inlet control structure located just south of the headworks structure. Four influent sluice gates regulate plant influent to the four climber bar screens.

The mechanically cleaned bar screens remove large objects (e.g., rags, sticks, paper items, etc.) from the influent. Debris removed from screens is lifted onto a dual-direction conveyor belt. During normal operation, screened items are conveyed to a hopper then lifted to a dewatering press via a screw conveyor. The screenings are dewatered to approximately 50 percent solids, and then discharged into a forklift-operated dump bin. Periodically, this bin is dumped into a 30-yard bin for landfill disposal.

The flow of raw sewage is slowed down into the aerated grit chambers by compressed air, which creates a rolling motion within the chamber, allowing heavy inorganic material and some organic material (e.g., sand, rocks, coffee grounds, eggshells, etc.) to settle out of the wastewater. The settled material is then screw-conveyed to a cyclone separator that uses the properties of a vortex to remove grit from the raw sewage.

From the aerated grit chambers, the sewage flows to the detritors, which also remove grit by gravity settling under slow velocity. The baffle obstructions in the tank reduce flow short-circuiting, thereby eliminating localized higher flow velocities. The settled grit is directed to a sump using mechanical arms fitted with sweepers. The grit in the sump is pumped by one of two pumps to one of two cyclone separators. Effluent from the preliminary treatment system is pumped to the primary settling tanks.

FIGURE 2-1
Plant Schematic
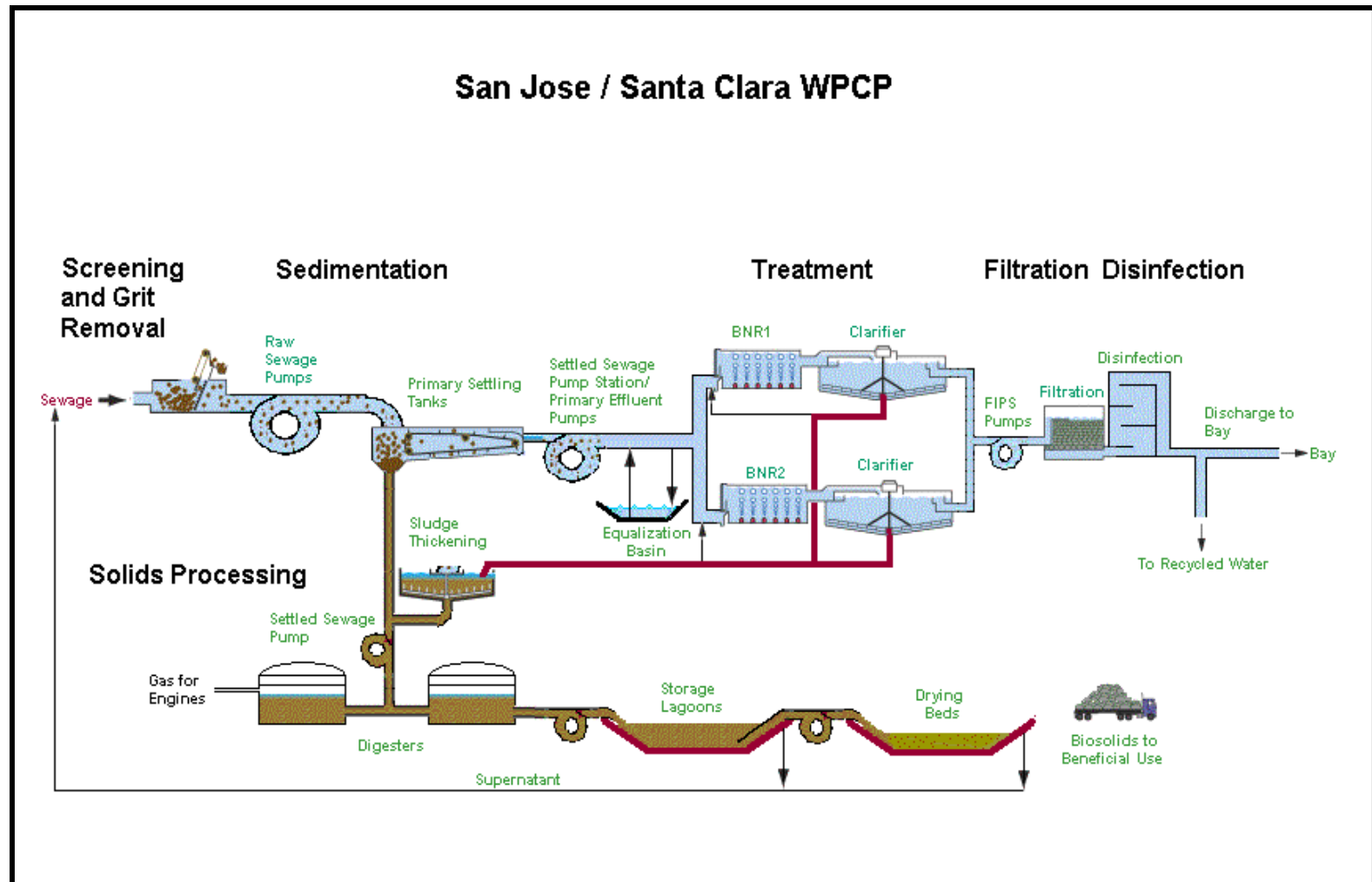
2.2 Primary Treatment

Following preliminary treatment, wastewater is pumped into primary clarifiers. The Plant has 24 primary clarifiers with a total surface area of 140,600 square-feet (ft^2) and a design peak overflow rate of 1,930 gallons per square foot per day ($gal/ft^2/d$). The primary clarifiers remove floatable material and settled material. The primary treatment process includes pumping of the floatable and settled solids to scum treatment and solids processing areas, respectively. The diurnal flow of primary influent dictates the surface loading rates on the primary settling tanks.

In any sedimentation tank, those materials that have a higher specific gravity than the sewage will tend to settle, and floating material and grease with a lower specific gravity will tend to rise. As the sludge collectors rotate through the bottom of the sedimentation tanks, the collectors push settled solids or sludge to the tank hopper where it is removed by raw sludge pumps for sludge treatment. As the chain and flight collectors rotate over the surface of the tank, floating material is pushed toward the skimming mechanism (scum pipe drive and scum trough). This material is removed by the automatic skimming device and conveyed to a scum well, where it is discharged to a scum pit.

Preliminary and primary treatment remove approximately 98 percent of all settleable solids, 40 to 60 percent of all suspended solids, and 20 to 50 percent of all biological oxygen demand (BOD). The remaining BOD and colloidal and non-settleable solids are conveyed to the Secondary Treatment Process for biological nutrient removal (BNR).

2.3 Secondary Treatment

In 1996, the Plant's secondary treatment was converted from separate activated sludge and nitrification processes to a BNR process. The BNR process involves the removal of ammonia (NH_3) and BOD in the same aeration basins. The first step in the removal of ammonia is nitrification, which is the sequential biological oxidation of ammonia to nitrite (NO_2) and then to nitrate (NO_3). The second step is denitrification, which is the biological reduction of nitrate to nitrogen gas (N_2).

BNR is operated as a single-stage step feed aeration process by routing primary effluent through the former secondary and nitrification systems in parallel (now all considered secondary activated sludge systems). The secondary activated sludge system has 16 aeration basins divided into two batteries (A and B); each battery consists of eight aeration basins. These eight rectangular aeration basins are further divided by baffles into four equal-sized compartments (quads).

The effluent from the aeration basins flows to clarifiers for solids removal via settling. The plant has 26 secondary clarifiers, with a total surface area of 227,500 ft^2 and a design peak overflow rate of 880 $gal/ft^2/d$. The majority of settled solids are returned to the aeration basins, and a fraction is wasted to the dissolved air flotation tanks for solids processing. Secondary effluent from each clarifier is collected in the effluent conduit and transported by gravity to the filter influent pump station from which it is pumped to the dual-media filters for filtration.

2.4 Filtration

Each dual-media filter bed consists of a tile under a drain system installed on the filter floor. The dual-media filter has layers of silica gravel, silica sand, and two layers of anthracite coal—all supported by the under drain system. Total filter surface area is 22,080 ft^2, and the single filter surface area is 1,380 ft^2. The filter flow maximum is 158 million gallons per day (mgd). Backwash water loaded with debris from filter cleaning is routed to a backwash equalization basin for storage before alum addition and flocculation. The chemically conditioned backwash water is then pumped to the raw sewage wet well for solids removal.

2.5 Disinfection

Effluent from the dual media filters is disinfected with chlorine in the chlorine contact chamber followed by dechlorination using sulfur dioxide. When required, caustic soda is added following dechlorination for pH adjustment.

2.6 Solids Processing

The dissolved air floatation system receives sludge from the primary sedimentation basins and wasted activated sludge from the secondary clarifiers. Dissolved air flotation further thickens the sludge before it enters the anaerobic digesters. Supernatant from dissolved air floatation returns to headworks.

Digested sludge from the anaerobic digesters is pumped to 28 active sludge lagoons. The lagoons are grouped in four blocks, with each block containing from six to eight lagoons. It normally takes one year to fill a lagoon block. While one block is being filled, one block is emptied, and the other two blocks are stabilizing the sludge to Class A quality. After two to three years of stabilization, dredged sludge is pumped to drying beds where it takes about three to four months to dry. Once dried, the sludge is stockpiled for transportation by outside contractors to a beneficial reuse site.[6]

2.7 Operational Issues

Between 2001 and 2005 there were no operational issues at the Plant due to influent toxicity. Elevated influent concentrations of tributyltin and cyanide were detected on several occasions, but these irregularities did not upset Plant operations.

Grease blockages have occasionally occurred in the collection system that are assumed to have been caused by residential and/or restaurant grease. The City of San Jose has a restaurant inspection program to educate restaurant and other food facility operators about proper grease disposal and to enforce maintenance requirements. All new restaurants and food facilities are required to complete a plan check to ensure the proper installation of grease removal devices.

Hydrogen sulfide odor is also a potential issue for the collection system. Most sulfide production results from long flat sewer lines in residential areas entering drop manholes

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[6] San Jose/Santa Clara Water Pollution Control On line Operational Manual, City of San Jose Environmental Services Department, 1/26/06 Update

causing release of sulfide gas into the atmosphere. The City has installed two biofilters to control hydrogen sulfide emissions and continually treats one of the main trunk lines with ferrous chloride to precipitate the sulfide from solution.

3.0 Discharges to the Plant

Table 3-1 presents a breakdown of the discharges from the residential, commercial, and industrial sectors. Commercial and residential wastewaters together comprise 93 percent of the discharges to the Plant, while the permitted industrial sector contributes the remaining 7 percent (Figure 3.1). This local limits evaluation used the 2002-2004 average Plant flow and the 2002-2004 sector loading data for MAIL calculations.

TABLE 3-1
Plant Effluent and Sector Flow Rates

Years	Effluent Discharged to Bay (mgd)	Plant Flows (mgd)	Residential Flows (mgd)	Permitted Industrial Flows (mgd)	Commercial Flows (mgd)
2002	110.1	118.4	73.5	8.2	36.7
2003	109.0	116.7	72.9	7.9	35.9
2004	105.6	114.7	72.2	7.4	35.1
Average	**108.2**	**116.6**	**72.9**	**7.8**	**35.9**

3.1 Industrial User Profile

Appendix A presents a list of 346 permitted industrial users and categorical zero discharge facilities. The categorical zero discharge industries include 17 metal finishing and one storage battery facility. Figure 3.2 presents the mean daily flow for the copper/nickel industrial dischargers. Figure 3.3 shows the number of industrial users and flow rate distribution for major industrial user types for the 328 permitted industrial users. These industrial users include 165 significant users with 149 of these being categorical industrial users. The City permits several source control categories as industrial users that are sometimes considered to be "commercial users," including laundries, photoprocessors, automotive shops, carwashes and jails. Electronic and Electronic Components (includes semiconductors) and Metal Finishing (includes Printed Circuit Boards) have the largest number of industrial users and contribute the largest volume of average flow. There are a large number of permitted Photo Processors; however the flow contribution from these users is minimal. Although Power Plants represent the fourth largest average industrial flow, there are only five power facilities each characterized by large cooling water discharges.

FIGURE 3-1
Plant Flow Rate by Sector
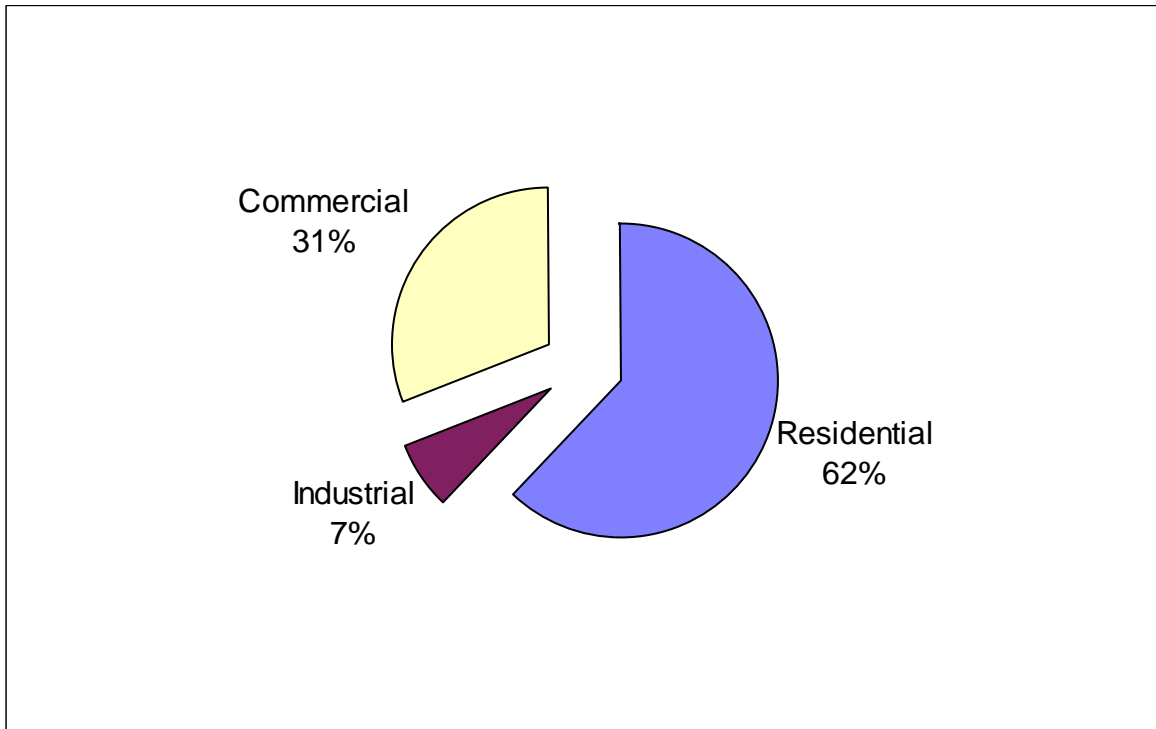
FIGURE 3-2
Mean Daily Flow by Industrial Group
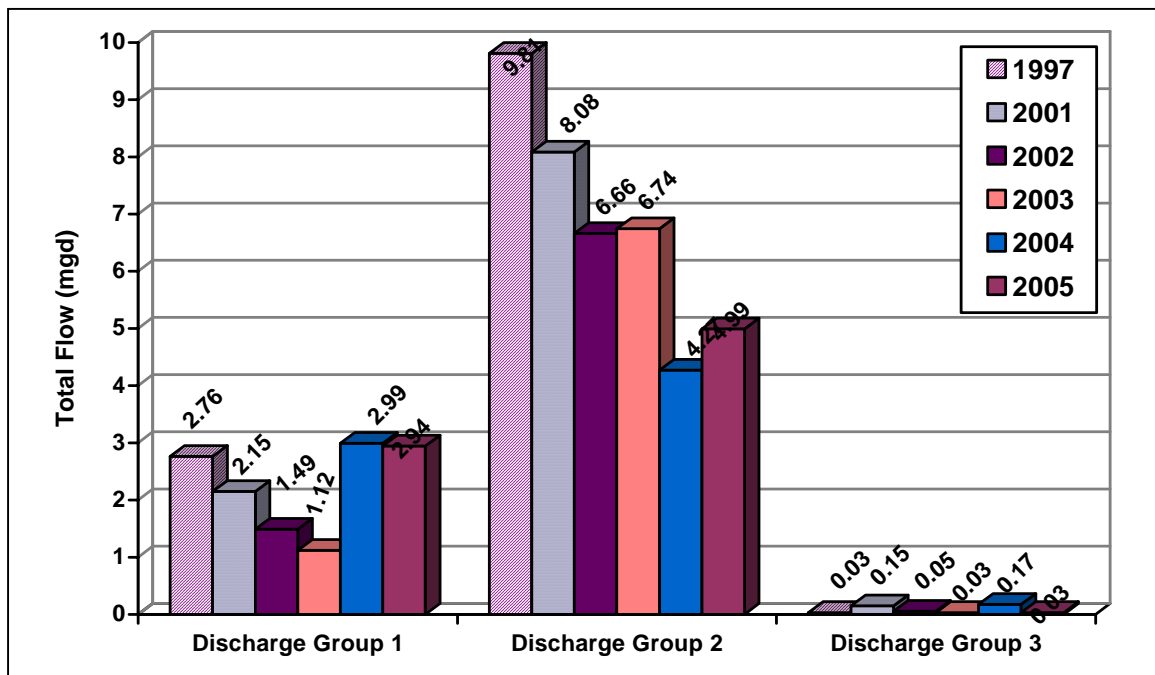
FIGURE 3-3
Characterization of Industrial Facility Types
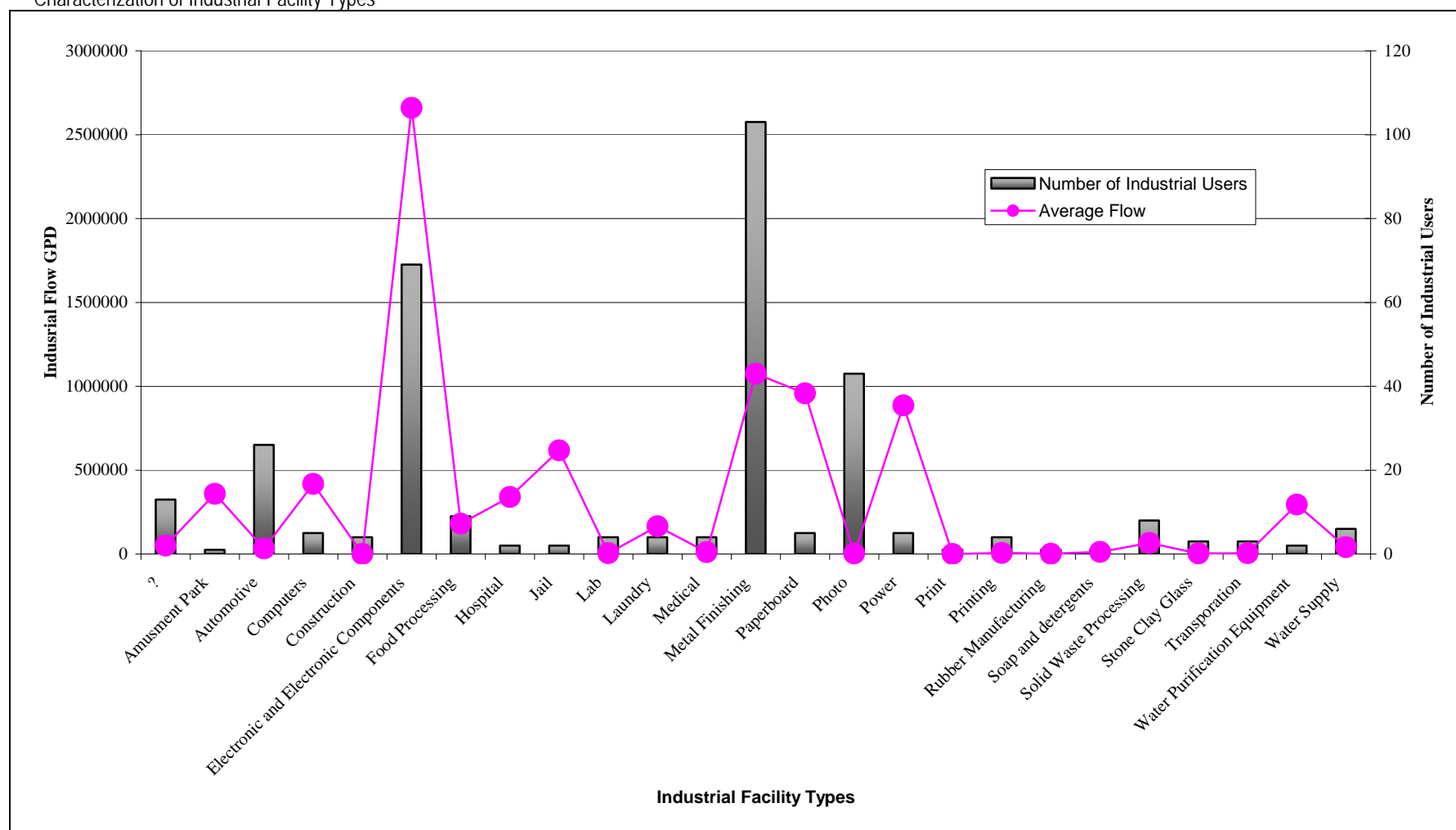
4.0 Compliance and Trends

The Plant has been in compliance with its regulatory requirements for conventional pollutants, toxic substances and whole effluent toxicity since receiving its most recent NPDES permit in 2003. For 2004, the City identified six groupings of pollutants of concern as part of their pollution minimization and prevention (PMP) requirements. A description of each pollutant grouping and the rationale for their inclusion is provided below:

- Copper and Nickel – These contaminants were deemed reportable priority pollutants due to reasonable potential to contribute to ambient levels in the South Bay,

- Mercury, 4,4'-DDE, Dieldrin, and Dioxin – These contaminants were deemed reportable priority pollutants due to a reasonable potential to contribute to an excursion above water quality criteria. Reasonable potential was determined due to background levels in the receiving waters being above the water quality criteria, and not due to levels in the Plant's effluent,

- Benzo(b)fluoranthese, Indeno(1,2,3-cd)pyrene, and Heptachlor epoxide – These contaminants were deemed reportable priority pollutants due to a reasonable potential to contribute to an excursion above water quality criteria. Reasonable potential was determined due to background levels in the receiving waters being above the water quality criteria, and not due to levels in the Plant's effluent.

- Cyanide – This contaminant was included due to potential future regulatory requirements.

- Fats, Oil & Grease (FOG) – These contaminants were included due to pending regulatory requirements for collection system operators to prepare Sewer System Management Plans, and

- Tributyltin – This contaminant was included due to potential future regulatory requirements.

For 4,4'-DDE, dieldrin, dioxin, benzo(b)fluoranthese, indeno(1,2,3-cd)pyrene, and heptachlor epoxide all Plant compliance monitoring have been reported non-detect since current analytical limits of detection are significantly above applicable water quality criteria. For mercury, the maximum pollutant concentration observed in Plant effluent is well below the applicable water quality criterion.

As shown in Table 4-1, industrial copper and nickel loading has significantly decreased since 1994. However, while the number of significant industrial users has decreased, the rate of change cannot account for the total reductions experienced during this time period.

Figures 4-1 and 4-2 present a historical perspective of annual industrial loading for copper and nickel, respectively.

TABLE 4-1
Industrial Pollutant Loading Trends for Copper and Nickel

Year	Number of Significant Users	Cu Loading (ppd)	Ni Loading (ppd)	IU Flow Rate (mgd)
1994	226	20	6.8	8.3
1996	247	-	-	13.3
1998	221	7.8	5.0	11.7
2000	249	7.5	4.4	10.3
2002	227	2.9	2.4	8.2
2004	171	4.7	2.5	7.4

The Plant experienced pass-through events for cyanide in 2004 and 2005 and for tributyltin in 2001 and 2004. The cyanide events exceeded the California Toxic Rule water quality criteria of 1.0 ppb applicable to South San Francisco Bay. In 2005, the City implemented a comprehensive industrial cyanide investigation. The City has already invested over 3,000 staff hours on this investigation, conducted over 80 industrial inspections, and analyzed nearly 600 samples for cyanide. One industrial user has been identified as bypassing treatment and has been referred to the City and District Attorney's Office for prosecution.[7]

The tributyltin events exceeded the Basin Plan marine water quality criteria of 0.005 ppb to protect human health. On December 11, 1995, the California Department of Pesticide Regulation enacted a San Francisco Bay area prohibition on the sale and use of tributyltin-containing cooling water additives. This action was taken to protect Bay water quality. The City was unable to identify an industrial source for the tributyltin pass-through events in 2001 and 2004. After the 2004 incident, the City distributed a tributyltin fact sheet to all industrial users and large cooling tower owners describing the product prohibition and proper disposal practices for tributyltin.

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[7] First Progress Report: Response to the EPAs Administrative Order #CWA-307-9-05-36, City of San Jose Environmental Services Department, June 30, 2005, Pg 31

FIGURE 4-1
Industrial Copper Loading
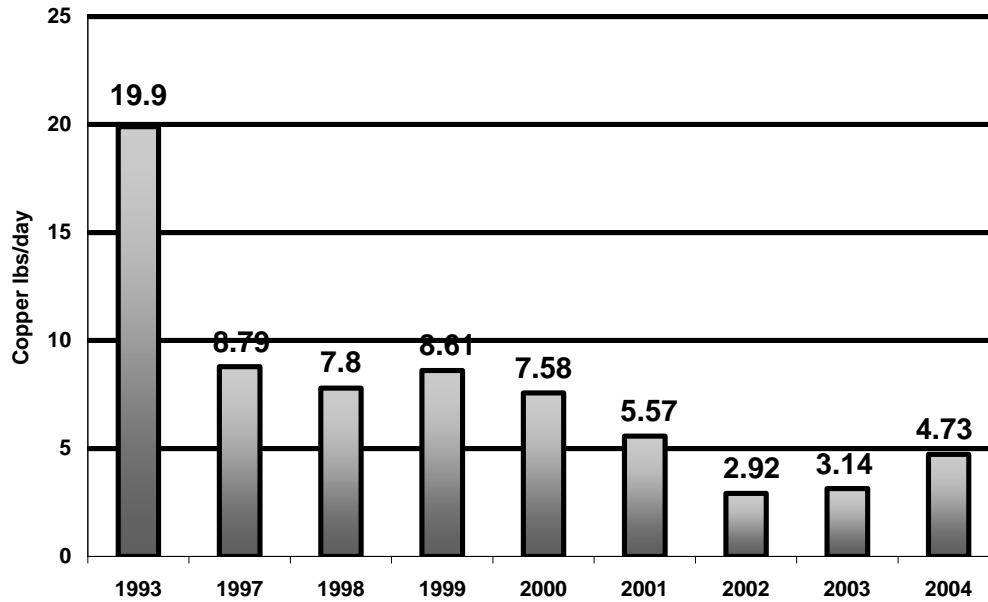
FIGURE 4-2
Industrial Nickel Loading
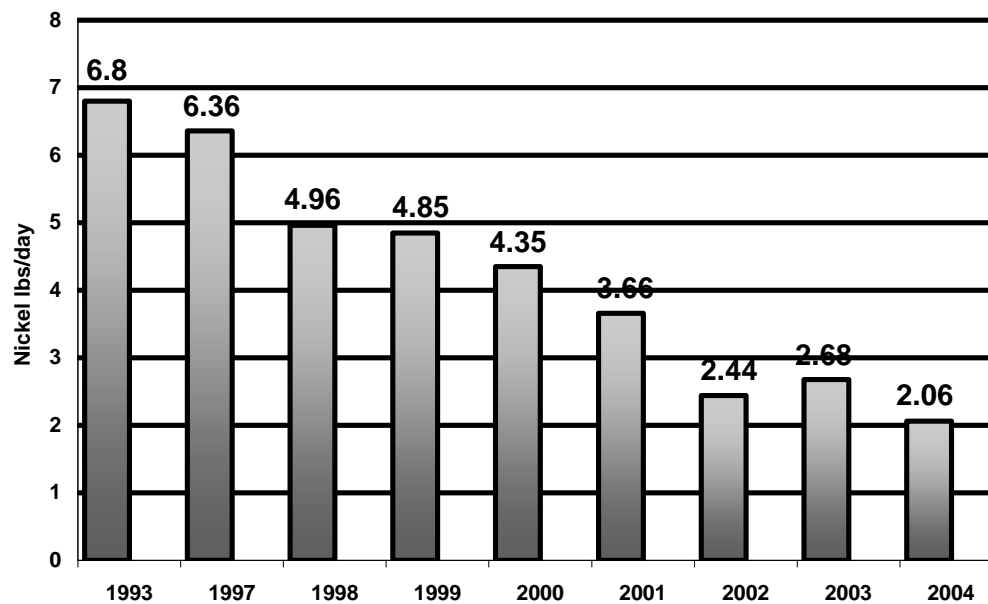
5.0 MAHL Analysis Process for Evaluating Local Limits

The present evaluation of industrial local limits was based on criteria described in the 2004 USEPA Guidance Manual. The steps of this evaluation process included:

- Developing POCs criteria,

- Collecting influent, effluent, and biosolids data,

- Selecting POCs,

- Calculating removal rates for potential POCs,

- Calculating AHL for each POC,

- Determining MAHL for each POC,

- Identifying POCs requiring new or revised local limits,

- Calculating the MAIL for POCs requiring new or revised local limits, and

- Allocating the MAIL among industrial users.

The following sections describe each of these steps in more detail.

5.1 Developing POCs Criteria

The primary objective of this evaluation was to develop local limits that protect the collection system, the wastewater treatment facility, the health and safety of personnel, and the environment. The following regulatory standards were reviewed for this evaluation:

- Plant's NPDES permit (2003),

- California Toxics Rule water quality criteria (2000),

- National Toxics Rule water quality criteria (1999),

- Federal Sewage Biosolids Standards (1995),

- Threshold Inhibition Values for Activated Sludge, Nitrification and Anaerobic Digestion (1987), and

- California State Hazardous Waste Threshold Values (2004).

5.2 Collecting Influent, Effluent and Biosolids Data

Evaluating the performance of current local limits and developing MAHLs for POCs requires various types of contaminant information. Most of the concentration data required

were readily available from data collected by the Plant for regulatory compliance. The data assembled for this evaluation included:

- Influent and effluent concentration data for 2002-2004. The Plant influent and effluent were expressly sampled in 2005 since data were unavailable for manganese and molybdenum,

- Plant influent, effluent and South Bay Water Recycling flow data for 2002-2004,

- Industrial user discharge concentration and flow data for 2002-2004, and

- Headworks loading analysis for copper and nickel.

The 2004 USEPA Guidelines Manual recommends using a minimum of 3 years of data. This evaluation used data from 2002 through 2004. The Guidence Manual also states that to develop sound, technically based local limits, the POTW should, review and evaluate the data collected to ensure they are accurate, reliable, and representative. This evaluation only used analytical information that meet the POTW's quality assurance /quality control (QA/QC) requirements to support the development of local limits. In addition, an analysis of 2005 monitoring data demonstrated concurrence with the sampling results from 2002 through 2004.

5.2.1   Pesticide Data Reliability

This evaluation included concentration data available from 2002 through 2004, including data from an inter-laboratory comparison of USEPA Method 608 performed during October 2002 through December 2003. Pesticide data from one of the commercial laboratories used in the study did not correlate well with non-detected results from two other commercial laboratories. Therefore, this evaluation did not include the questionable data. For additional details on this inter-laboratory comparison study refer to the City's January 2004 report, *San Jose/Santa Clara Water Pollution Control Plant Lab Reliability Evaluation for Aldrin*.

5.2.2   Non-detectable Data

Laboratory analytical methods may provide different minimum detection limits and minimum reporting levels. For this report, minimum detection limit is the lowest concentration level the laboratory can detect as defined in 40 CFR Part 136, whereas minimum reporting levels represents the lowest calibration standard used for a specific analytical procedure. The Plant's 2003 NPDES permit includes criteria for the minimum reporting level and minimum detection level that must be maintained. For this evaluation, USEPA-approved test methods were initially selected to provide a numerical value above the minimum detection level. However, there is a point for each contaminant at which the concentration becomes too low to be accurately detected by the most sensitive standard methods presently available.

Although numerical values above the minimum detection level and below the minimum reporting level can be determined, these values are not accurate enough to be considered quantifiable for comparison with regulatory limits. Therefore, these values are considered "detected but not quantified."

For this local limits evaluation, these "detected but not quantified" values were used for developing the removal rates and evaluating the influent and effluent loading, where available. The 2004 USEPA Guidelines Manual recommends that an actual value be calculated for any non-detect concentration data based upon the sample set of detectable values. For data with 30 percent or less non-detects, the 2004 USEPA Guidelines Manual recommends the regression order statistic (ROS) and probability plotting (MR) methods to calculate values for the non-detect information. The ROS and MR methods are described further in Appendix B. However, if more than 30 percent of the data were non-detects, the non-detect information was replaced with a value equal to one half the detection limit.

5.2.3 Influent Data Spikes

The 2004 USEPA Guidance Manual states that influent spikes from spills should not be used as a basis for decreasing local limits. Therefore, this evaluation did not include influent concentration spikes above the third standard deviation or the 99.7 percentile for most metals as the data sets were sufficiently large. However, the evaluation included all organic data since most organic contaminants had much smaller data sets than that for metals.

5.3 Selecting POCs

The following sections describe how toxic and conventional pollutants were evaluated for inclusion on the final list of POCs to be examined through the MAHL process. A POC is any pollutant that might reasonably be expected to be discharged to the POTW in sufficient amounts to cause pass through or interference, cause problems in its collection system, or jeopardize its workers. Pollutants contributing to or known to cause operational problems are also considered POCs even if the pollutants are not currently causing NPDES permit violations. The methods used to determine POCs should account for daily fluctuations in POTW pollutant loadings and data availability.

The POCs were examined by evaluating current influent and effluent concentration information for regulatory compliance. If concentration data were below the minimum detection level for both influent and effluent, then local limits could not be calculated directly for these contaminants. EPA recommends that a POTW conduct a screening analysis for any pollutants determined to be potential POCs. Although a contaminant may initially be considered a potential POC, the POTW may determine, based on the pollutant's concentration and on other data from IUs and commercial dischargers, that the pollutant need not be selected as a POC for the full headworks analysis.

5.3.1 USEPA-Recommended POCs

EPA has identified 15 contaminants often found in POTW sludge and effluent that it considers potential POCs. EPA recommends that each POTW, at a minimum, screen for the presence of these 15 pollutants using data on industrial user (IU) discharges and collected from samples of POTW influent, effluent, and sludge. These POCs include:

- Ammonia

- Arsenic

- BOD

- Cadmium

- Chromium (total)

- Copper

- Cyanide

- Lead

- Mercury

- Molybdenum

- Nickel

- Selenium

- Silver

- TSS

- Zinc

Cadmium, chromium, copper, lead, nickel, and zinc are recommended for evaluation because of their widespread occurrence in POTW influents and effluents at concentrations that may warrant concern. Arsenic, cyanide, and silver are not as widespread in POTW influents, but these constituents have particularly low biological process inhibition and/or aquatic toxicity values. Cyanide is also a concern due to its potential to develop toxic sewer gases. Molybdenum and selenium are of potential concern because they are regulated through the federal biosolids regulations. Selenium is also of special interested in the San Francisco Bay Area due to its predominance for bioaccumulation. The USEPA recommends including the conventional pollutants BOD, ammonia, and TSS because many POTWs nationwide have issues with these pollutants.[8]

5.3.1.1 Screening Analysis for EPA-Recommended POCs

The conventional contaminants ammonia, biochemical oxygen demand and total suspended solids warrant further technical analysis to determine their appropriateness as POCs. The following presents a discussion of these conventional pollutants as POCs:

5.3.1.1.1   Ammonia

The NPDES permit limits for ammonia are 8 mg/L as a daily maximum and 3 mg/L as a monthly average. Ammonia has not been considered a POC in the past, and all effluent data were found to be far below the applicable NPDES permit limits between 2002 and 2004. Plant effluent ammonia data for the period 2002 – 2004 are exemplified by a mean of 0.5 mg/L and a maximum of 0.9 mg/L. In addition, the City has a narrative "interfering substances" sewer use ordinance limitation that has proven protective of the collection system and treatment plant with respect to ammonia. Section 15.14.585 Part B of the San Jose Municipal Code reads:

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[8] *EPA Local Limits Development Guidance*, EPA 833-04-002A, United States Environmental Protection Agency, Office of Water Management 4203, July 2004, pg. 3-1

No person shall discharge, cause, allow, or permit to be discharged into the sanitary sewer system or any part thereof, any toxic or poisonous substances or any other pollutant, including biochemical oxygen demand, in sufficient quantity to injure or cause an interference with the sewage treatment process, or in sufficient quantity to constitute a hazard to humans or animals, or in sufficient quantity to create a hazard for humans, or aquatic life in any waters receiving effluent from the sanitary sewer system, or which may create a hazard in the use or disposal of sewage sludge.

The City of San Jose implements ammonia regulation on its largest industrial dischargers, those discharging greater than 25,000 gallons of wastewater daily, through a "revenue program' whereby the industrial facility is charged according to the strength of sewage discharged to the collection system.

Therefore, further review of ammonia for evaluation as an industrial local limit is not warranted at this time. In addition, ammonia would not reasonably be expected, with pretreatment regulations and wastewater treatment currently in effect, to result in pass through, interference, biosolids contamination, collection system problems, or increased worker jeopardy.

5.3.1.1.2   Biochemical Oxygen Demand (BOD)

The NPDES permit limits for BOD are 20 mg/L as a daily maximum and 10 mg/L as a monthly average. BOD has not been considered a POC in the past, and all effluent data were found to be far below the applicable NPDES permit limits between 2002 and 2004. Plant effluent BOD data for the period 2002 – 2004 are exemplified by a mean of 3 mg/L and a maximum of 6 mg/L. In addition, the City has a narrative "interfering substances" sewer use ordinance limitation that has proven protective of the collection system and treatment plant with respect to BOD. Section 15.14.585 Part B of the San Jose Municipal Code reads:

No person shall discharge, cause, allow, or permit to be discharged into the sanitary sewer system or any part thereof, any toxic or poisonous substances or any other pollutant, including biochemical oxygen demand, in sufficient quantity to injure or cause an interference with the sewage treatment process, or in sufficient quantity to constitute a hazard to humans or animals, or in sufficient quantity to create a hazard for humans, or aquatic life in any waters receiving effluent from the sanitary sewer system, or which may create a hazard in the use or disposal of sewage sludge.

The City of San Jose implements BOD regulation on its largest industrial dischargers, those discharging greater than 25,000 gallons of wastewater daily, through a "revenue program' whereby the industrial facility is charged according to the strength of sewage discharged to the collection system.

Therefore, further review of BOD for evaluation as an industrial local limit is not warranted at this time. In addition, BOD would not reasonably be expected, with pretreatment regulations currently in effect, to result in pass through, interference, biosolids contamination, collection system problems, or increased worker jeopardy.

5.3.1.1.3   Total Suspended Solids (TSS)

The NPDES permit limits for TSS are 20 mg/L as a daily maximum and 10 mg/L as a monthly average. TSS has also not been considered a POC in the past, and all effluent data were found to be far below the applicable NPDES permit limits between 2002 and 2004.

Plant effluent TSS data for the period 2002 – 2004 are exemplified by a mean 2 mg/L of and a maximum of 5 mg/L. In addition, the City has a narrative "suspended solids/dissolved matter" sewer use ordinance limitation that has proven protective of the collection system and treatment plant with respect to TSS. Section 15.14.595 of the San Jose Municipal Code reads:

> *No person shall discharge, cause, allow or permit to be discharged into the sanitary sewer system or any part thereof, any liquid containing suspended solids or dissolved matter of such character and quantity that unusual attention or expense is required to handle, process or treat such matter at the Plant.*

The City of San Jose implements TSS regulation on its largest industrial dischargers, those discharging greater than 25,000 gallons of wastewater daily, through a "revenue program' whereby the industrial facility is charged according to the strength of sewage discharged to the collection system.

In addition, TSS would not reasonably be expected, with pretreatment regulations currently in effect, to result in pass through, interference, biosolids contamination, collection system problems, or increased worker jeopardy. Therefore, further review of TSS for evaluation as an industrial local limit is not warranted at this time.

5.3.2   Reasonable Potential POCs

The USEPA 2004 Guidance Manual recommends that any contaminant that has a "reasonable potential" to be discharged in amounts that could exceed water quality criteria should be considered a POC and evaluated accordingly. However, a POTW does not have to develop a local limit for every pollutant for which there is a water quality standard or criterion. A reasonable potential analysis (RPA) completed in 2003 as part of the NPDES Permit reissuance process found that the following constituents had a "reasonable potential" to cause or contribute to a water quality exceedance:

- Benzo(b)Fluoranthene
- Copper
- 4,4-DDE
- Dieldrin
- Dioxin TEQ
- Endosulfan beta
- Heptachlor Epoxide
- Indeno(1,2,3-cd)Pyrene
- Mercury
- Nickel

An analysis of 2002-2004 contaminant concentration data with applicable Water Quality Criteria (WQC) was conducted to reaffirm the pollutants of concern resulting from a

reasonable potential analysis (Appendix C). The RPA analysis using 2002-2004 data determined that two additional constituents could now be considered as having "reasonable potential" to cause or contribute to a water quality exceedance:

- Cyanide
- Tributyltin

5.3.2.1 Screening Analysis for Reasonable Potential POCs

The following sections describe each of the organic pollutants of concern identified as possessing "reasonable potential" and the local limit actions recommended for each contaminant.

5.3.2.1.1 Pesticides

In 2003, the pesticides 4,4-DDE, dieldrin, endosulfan beta, and heptachlor epoxide were found to have reasonable potential based upon State Implementation Policy (SIP) guidance. Reasonable potential was due to ambient background conditions exceeding the applicable water quality objective. These pesticides had not been measured in Plant effluent above applicable water quality criteria. In 2005 the State Water Resource Control Board revised the SIP and eliminated the reasonable potential trigger for situations where ambient background pollutant concentrations are greater than a priority pollutant objective or criterion. Thus, 4,4-DDE, dieldrin, heptachlor epoxide, and endosulfan beta would not be found to have "reasonable potential" using current SIP guidance.

4,4-DDE. 4,4-DDE (dichlorodiphenyldichloroethylene) is a chemical similar to DDT that contaminates commercial DDT preparations. DDE has no commercial use. DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. In 1972, the USEPA banned all uses of these insecticides.[9] DDE enters the environment as a contaminant or breakdown product of DDT. DDE in air is rapidly broken down by sunlight. DDT in soil is broken down slowly to DDE and DDD by microorganisms, with a half-life of 2-15 years depending on the soil type. DDT, and especially DDE, builds up in plants and in fatty tissues of fish, birds, and other animals.

No further local limits action for 4,4-DDE is planned at this time since this contaminant's parent compound (DDT) has been banned since 1972 and neither DDT, nor its breakdown products (DDE, DDD) have been measured in Plant effluent above applicable water quality criteria. Therefore, it would not reasonably be expected that any chemical form of DDT would lead to pass through, interference, biosolids contamination, collection system problems, or increased worker jeopardy.

Dieldrin. Aldrin and dieldrin are insecticides with similar chemical structures. Aldrin quickly breaks down to dieldrin in the environment. From the 1950 until 1970, aldrin and dieldrin were widely used pesticides on crops like corn and cotton. Because of concerns about damage to the environment and potentially to human health, the USEPA banned all uses of

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[9] "ToxFAQs™ for DDT, DDE and DDD" U.S. Department of Health and Human Services, Public Health Service Agency for Toxic Substances and Disease Registry (ATSDR), http://www.atsdr.cdc.gov/tfacts35.html, September 2002

aldrin and dieldrin in 1974, except for the control of termites. In 1987, the USEPA banned all uses of these insecticides.[10]

No further local limits action for dieldrin is planned at this time since this contaminant has been banned since 1987 and has never been measured in Plant effluent above applicable water quality criteria. Therefore, it would not reasonably be expected that dieldrin would lead to pass through, interference, biosolids contamination, collection system problems, or increased worker jeopardy.

Endosulfan Beta. Endosulfan beta is one form of another substance called endosulfan. Endosulfan has not been produced in the United States since 1982, but is has been used to make other chemicals. Endosulfan beta is used to control insects on food and non-food crops and also as a wood preservative. It is a USEPA toxicity Class I restricted use pesticide. In California, spraying of lettuce, tomatoes, and artichokes accounts for half of its total use today. There has been much concern about the toxic effect of endosulfan, and its use has been decreasing steadily from 1,077,711 pounds in 1971[11] to 134,080 pounds in 2003.[12]

No further local limits action for endosulfan beta is planned at this time since this contaminant is no longer manufactured in the United States, is highly restructured for agricultural use, and has not been measured in Plant effluent above applicable water quality criteria. Therefore, it would not reasonably be expected that endosulfan beta would lead to pass through, interference, biosolids contamination, collection system problems, or increased worker jeopardy.

Heptachlor Epoxide. Bacteria and animals break down heptachlor to form heptachlor epoxide. The epoxide is more likely to be found in the environment than the parent compound heptachlor. Heptachlor was used extensively in the past for killing insects in homes, buildings, and on food crops, especially corn. These uses were banned in 1988. Currently, it can only be used for fire ant control in power transformers.[13]

No further local limits action for heptachlor epoxide is planned at this time since this contaminant has been banned since 1989 and has never been measured in Plant effluent above applicable water quality criteria. Therefore, it would not reasonably be expected that heptachlor epoxide would lead to pass through, interference, biosolids contamination, collection system problems, or increased worker jeopardy.

Tributyltin. The tributyltin (TBT) compounds are a subgroup of the trialkyl organotin family of compounds. They are the main active ingredients in biocides used to control a broad spectrum of organisms. Uses include wood treatment and preservation, antifouling of boats (in marine paints), antifungal action in textiles and industrial water systems, such as cooling tower and refrigeration water systems, wood pulp and paper mill systems, and breweries.

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[10] "ToxFAQs™ for Aldrin/Deildrin" U.S. Department of Health and Human Services, Public Health Service Agency for Toxic Substances and Disease Registry (ATSDR), http://www.atsdr.cdc.gov/tfacts1.html, September 2002

[11] Toxicological Profile for Endosulfan, U.S. Department of Health and Human Services, Public Health Service Agency for Toxic Substances and Disease Registry (ATSDR), http://www.atsdr.cdc.gov/toxprofiles/tp41-c4.pdf, page 183, September 2000

[12] "PAN Pesticides Database - California Pesticide Use, Endosulfan - Pesticide use statistics for 2003", table, "Regional Use for Endosulfan on All Sites in 2003", S. Orme and S. Kegley,PAN Pesticide Database, Pesticide Action Network (PAN), North America (San Francisco, CA. 2006), http:www.pesticideinfo.org.
http://www.pesticideinfo.org/Detail_ChemUse.jsp?Rec_Id=PC35085

[13] "ToxFAQs™ for Heptachlor and Heptachlor Epoxide", U.S. Department of Health and Human Services, Public Health Service Agency for Toxic Substances and Disease Registry (ATSDR), http://www.atsdr.cdc.gov/tfacts12.html, September 2005

On December 11, 1995, the California Department of Pesticide Regulation enacted a San Francisco Bay area prohibition on the sale and use of tributyltin-containing cooling water additives. This action was taken to protect Bay water quality. The State Department of Pesticide Regulation has notified manufacturers and major distributors of the Product sale and use ban. Whether notification was received or not, manufacturers and distributors are legally liable for selling these products in the nine San Francisco Bay area counties (San Francisco, Santa Clara, San Mateo, Alameda, Contra Costa, Solano, Napa, Marin, and Sonoma). Cooling water system owners and operators are also legally liable for using the banned product. In 2003, the International Maritime Organization banned the use of tributyltin that's used in anti-fouling paint on ships. The ban started in 2003 and all TBT based paints are to be phased out by 2008.

In 2004, the USEPA published revised freshwater and saltwater aquatic life criteria for TBT. The most conservative water quality criterion for TBT is the Chronic Saltwater Criterion of 0.0074.[14] Twice in calendar year 2003 and once in calendar year 2004, TBT was detected in the Plant's effluent. The 2004 effluent measurement was determined to be slightly above the TBT chronic saltwater criterion. Since TBT is normally not detected in the effluent, these instances were undoubtedly the result of illegal discharges. In response, the City distributed an updated best management practice brochure entitled "A Fact Sheet for Tributyltin" to facilities with cooling towers in the tributary area. The purpose of this brochure was to remind cooling tower operators not to use products containing TBT that, although not commercially available, may still be in circulation.

No further local limits action for tributyltin is planned at this time since this contaminant has been banned from sale and use by the state of California since 1995. The City will continue to routinely monitor the effluent for TBT detection and will periodically distribute educational outreach materials to affected users as appropriate. In addition, it would not reasonably be expected that tributyltin would lead to interference, biosolids contamination, collection system problems, or increased worker jeopardy.

5.3.2.1.2   Dioxins and Polynuclear Aromatic Hydrocarbons

Dioxins. TCDDs are a family of 75 chemically related compounds commonly known as chlorinated dioxins. One of these compounds is 2,3,7,8-TCDD (tetrachlorodibenzo-*p*-dioxin) and it is the most toxic form of dioxin and the most studied. TCDDs are not intentionally manufactured by industry except for research purposes. TCDDs (mainly 2,3,7,8-TCDD) may be formed during the chlorine bleaching process at pulp and paper mills. TCDDs are also formed during chlorination by waste and drinking water plants.[15] By far, the greatest unintentional production of TCDDs occurs via various combustion and incineration processes, including all forms of waste incineration (municipal, industrial, and medical); many types of metal production (iron, steel, magnesium, nickel, lead, and aluminum); and fossil fuel and wood combustion.[16]

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[14] 2003 San Jose/Santa Clara Water Pollution Control Permit, Attachment 1 & 2

[15] "ToxFAQs™ for Chlorinated Dibenzo-p-dioxins (CDDs)" U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), http://www.atsdr.cdc.gov/tfacts104.html, February 1999

[16] Toxicological Profile for Chlorinated Dibenzo-p-dioxins (CDDs), U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR), http://www.atsdr.cdc.gov/toxprofiles/tp104-c4.pdf, page 369, December 1998

The water quality objective for 2,3,7,8-TCDD is extremely low at 1.4E-8 ppb, significantly lower than the current minimum reporting level of 5 ppb or the minimum detection level of 0.01 ppb. Although 2,3,7,8-TCDD has never been detected in Plant effluent, other dioxin congeners have been detected using research-based low-level monitoring techniques. In 2003, the Regional Water Board determined that the Plant had reasonable potential for dioxin based upon these research-level measurements and the inclusion of dioxins and furans on the 303(d) list of impaired water bodies.

The 2003 NPDES Permit states that detection limits historically used by the discharger are insufficient to determine the concentrations of dioxin congeners in the discharge. Likewise, the lack of good quality dioxin information would preclude the derivation of applicable industrial local limits. Furthermore, our inability to accurately measure dioxins at low concentration prevents us from determining whether an industrial discharge has the potential to exceed an applicable local limit. Lastly, the Permit further states that final limits for Dioxin TEQ will be based upon the wasteload allocated to the discharger from the total maximum daily load (TMDL). Therefore, no further local limits action for Dioxin TEQ is planned at this time.

A 2000 City report entitled *Selected Organics Source Investigation – Program Report* described an evaluation of industrial processes that could generate and discharge organochlorine pesticides, PCBs, or dioxin to the Plant. These processes include pesticide manufacturing, incineration with fume scrubbers, and paper production. The report concluded that no known industrial facilities that could generate organochlorine pesticides, PCBs, or dioxin were located in the Plant service area.[17] This analysis is nevertheless applicable today since the composition of the industrial community has not changed appreciably from that present in 2000.

Indeno(1,2,3-Cd)Pyrene & Benzo(B) Fluoranthene. The 2003 RPA concluded there was "reasonable potential" for benzo(b) fluoranthene and indeno(1,2,3-cd)pyrene because the background concentrations were greater than the applicable water quality objectives. Both of these contaminants are polynuclear aromatic hydrocarbons (PAHs) resulting from the incomplete combustion of carbon and hydrogen fuels. In 2005 the State Water Resources Control Board revised the SIP and eliminated the reasonable potential trigger for situations where ambient background pollutant concentrations are greater than a priority pollutant objective or criterion. Therefore, both benzo(b) fluoranthene and indeno(1,2,3-cd)pyrene would not be found to have "reasonable potential" using current SIP guidance.

The water quality objective for these two PAHs is 0.049 ppb, concentration values that are below the minimum detection levels of standard methodology. Although benzo(b) fluoranthene was "detected but not quantified" on one occasion in 2003, neither of these PAHs have ever been measured above minimum reporting levels in the Plant effluent. As in the case for Dioxin TEQs, there is not sufficient good quality monitoring information to derive applicable industrial limits for these compounds. Furthermore, our inability to accurately measure PAHs at low concentrations prevents us from determining whether an industrial discharge has the potential to exceed an applicable local limit. Therefore, no further local limits action for either benzo(b) fluoranthene nor indeno(1,2,3-cd)pyrene is planned at this time.

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[17] "Selected Organics Source Investigation – Program Report", July 2000 CBS Report

5.3.3 NPDES Permit Limit POCs

Conventional pollutants with limitations in the NPDES Permit should be considered when evaluating local limits. The following conventional pollutants from the 2003 NPDES Permit have already been assessed above as POCs: BOD, Ammonia and Totals Suspended Solids. The following presents a discussion of the remaining conventional pollutants for a determination of their inclusion as a POC:

5.3.3.1 Oil and Grease

The NPDES permit limits for oil and grease are 10 mg/L as a daily maximum and 5 mg/L as a monthly average. The influent is rarely analyzed for oil and grease concentration as this parameter has not been considered a POC in the past, and all effluent data were found to be below the minimum detection level of 5 mg/L between 2002 and 2004. The current 150 mg/L oil and grease industrial limit functions to protect the collection system from flow obstructions. The City's current local limit is deemed satisfactory since it has protected the collection system from unfavorable effects due to oil and grease contamination. Therefore, further review of oil and grease for evaluation as an industrial local limit is not warranted at this time. In addition, oil and grease would not reasonably be expected to result in pass through, interference, biosolids contamination, collection system problems, or increased worker jeopardy.

5.3.3.2 Settleable Matter

The NPDES permit limits for settleable matter are 0.2 mg/L-hr as a daily maximum and 0.1 mg/L-hr as a monthly average. The limit of detection for this test is 0.1 mg/L-hr. The Plant effluent has been below the detection limit for settleable matter 100 percent of the time between 2002 and 2004.   In addition, the City already has a narrative "suspended solids/dissolved matter" sewer use ordinance limitation that has proven protective of the collection system and treatment plant. Therefore, further review of settleable matter for evaluation as an industrial local limit is not warranted at this time. In addition, settlable matter would not reasonably be expected to result in pass through, interference, biosolids contamination, collection system problems, or increased worker jeopardy.

5.3.3.3 Turbidity

The NPDES permit limit for turbidity is 10 NTUs as an instantaneous maximum. The Plant effluent has exhibited turbidly values significantly below this limitation between 2002 and 2004, with effluent concentrations characterized by a mean value of 1.2 NTU and a maximum value of 2.8 NTU. In addition, the City has a narrative "colored matter" sewer use ordinance limitation that has proven protective of the collection system and treatment plant. Therefore, further review of turbidity for evaluation as an industrial local limit is not warranted at this time. In addition, turbidity would not reasonably be expected to result in interference, biosolids contamination, collection system problems, or increased worker jeopardy.

5.3.3.4 Chlorine Residual

The NPDES permit limit for chlorine residual is 0.0 mg/L as an instantaneous maximum. The Plant effluent has not experience any permit exceedances of this permit limitation

between 2002 and 2004. Therefore, further review of chlorine residual for evaluation as an industrial local limit is not warranted at this time.

5.3.4 Local Limits POCs

Local limits are developed to reflect specific needs and capabilities at individual POTWs and are designed to protect the ambient receiving waters. Regulations in 40 CFR 403.8(f)(4) state that POTW Pretreatment Programs must develop local limits or demonstrate that they are unnecessary; 40 CFR 403.5(c) states that local limits are needed when pollutants are received that could result in pass through or interference at the POTW. Essentially, local limits translate the general prohibited discharge standards of 40 CFR 403.5 to site-specific needs.

Toxic substances with local limits already regulated by the sewer use ordinance should be evaluated to determine if a constituent should remain a POC. The pollutants with industrial local limits not already assessed above include: antimony, beryllium, manganese, phenol and its derivatives (total phenol), Total Toxic Organics (TTO) and xylene. Antimony, beryllium, manganese, total phenol, and xylene were found to have sufficient influent and effluent concentration data necessary to develop an MAHL, therefore these contaminants will further undergo local limits evaluation. However, Total Toxic Organics do not fit the typical profile for MAHL process development since the TTO limit is evaluated as the sum of 50 organic pollutants and/or organic contaminant classes, and is further complicated as much of the concentration data is below currently available limits of detection.

5.3.4.1 Total Toxic Organics (TTO)

Most industrial toxic organic pollutants are regulated by the TTO local limit. The list of organic compounds comprising the TTO limitation and the 2.13 mg/L numeric limit are based on the daily maximum categorical limit established by the USEPA for large dischargers (>10,000 gallons per day) in the metal finishing and electroplating source categories.

The TTO limit is comprised of 50 separate organic pollutants and/or organic contaminant classes, many of which possess water quality objectives that are far below the minimum detection levels of standard methodology. Furthermore, measurements of the Plant effluent for regulatory compliance purposes have not indicated that any of these compounds or constituent classes would be expected to cause or contribute to a water quality exceedance. Moreover, there is not sufficient good quality monitoring information to derive an applicable industrial limits for each of these compounds. Therefore, no further local limits action for TTO is planned at this time.

Appendix D lists the 2002-2004 maximum and average influent and effluent concentration data for those toxic organic constituents monitored for regulatory purposes, as well as applicable water quality criteria for comparative purposes.

5.3.5 2006 Pollutants of Concern for MAHL Analysis

Table 5-1 lists the 2006 POCs that have been selected for further local limits analysis, along with concentration and loading data the period 2002 -2004. These concentration and loading values will be used for comparison with the MAHL developed in the next section.

TABLE 5-1
POCs Influent and Effluent Concentrations for 2002-2004

Pollutants of Concern	2002-2004 Maximum Influent		2002-2004 Average Influent		2002-2004 Maximum Effluent		2002-2004 Average Effluent	
	Ppb	ppd	ppb	ppd	ppb	ppd	ppb	ppd
Antimony*	1.6	1.6	0.7	0.7	1.6	1.4	0.7	0.6
Arsenic	3.3	3.2	2.1	2.1	1.6	1.4	1.0	0.9
Beryllium*	0.37	0.36	0.16	0.15	0.29	0.27	0.07	0.06
Cadmium	1.10	1.07	0.30	0.29	0.23	0.21	0.05	0.05
Chromium (Total)	14.0	13.6	7.3	7.1	1.7	1.5	0.7	0.6
Copper	156	152	96	93	6.0	5.4	2.9	2.6
Cyanide	<5	<5	<5	<5	<5	<5	<5	<5
Lead	9	9	6	6	2.5	2.2	0.6	0.5
Manganese	125	122	102	98.3	9.43	8.51	1.91	1.72
Mercury	0.50	0.48	0.30	0.30	0.003	0.003	0.002	0.002
Molybdenum	28.8	28.0	15.1	14.7	12.1	10.9	9.6	8.7
Nickel	23	22	13.5	13.1	11	10	6	5
Phenol and its Derivatives	40	39	21	21	13	13	4	4
Selenium	4.7	4.5	2.1	2.0	0.811	0.732	0.484	0.437
Silver	5.0	4.9	2.8	2.7	0.24	0.22	0.09	0.08
Xylene (ortho and meta)	3.4	3.3	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Zinc	529	514	341	331	120	115	54	52

* Only effluent values were available for Antimony and Beryllium. Antimony influent values were estimated assuming a 0% removal rate. Beryllium influent values were derived through a sludge mass balance calculation since data was available to characterize biosolids concentrations that was above detection limits..

5.4   Calculating Removal Rates

Removal rate is the percentage of the influent POC loading that is removed from the wastewater through the wastewater treatment process. Removal rates for each POC are fundamental inputs to the MAHL calculations. Removal efficiency methodologies vary by degree of data quality and calculation method. There are three main types of removal rates used for calculation of the different POCs: (1) primary effluent removal rates, (2) third decile effluent removal rates, and (3) effluent removal rates for biosolids-based allowable headworks loading (AHL). Table 5-2 lists the removal rates calculated for each POC.

5.4.1   Primary Effluent Removal Rates

Since the Plant's BNR treatment process combines activated sludge and nitrification treatment into one process, unlike the traditional activated sludge secondary effluent followed by the nitrification treatment system, it was necessary to use the primary effluent removal rate instead of a secondary one to enable calculations for nitrification inhibition AHL. Therefore, the "primary removal rate" was used instead of the "secondary removal rate" in the nitrification inhibition AHL and the activated sludge inhibition equations.

The primary removal rate is the percentage of influent potential POC loading that is removed from the wastewater through the Plant's primary processes. These processes included the barscreen, grit removal, and primary sedimentation systems. Ammonia had representative primary effluent values available for calculating a removal rate. However, most of the other POCs required using either literature values from the 2004 USEPA Guideline Manual Appendix R or an assumed "worse case scenario" of zero percent removal.   Only copper and nickel had Plant-specific primary removal rates already determined from a 1998 investigation entitled *In-Plant Copper Reduction and Treatment Processes Optimization Program.*[18]

5.4.2   Third Decile Effluent Removal Rates

The USEPA 2004 Guidance Manual recommends the third decile method for calculating effluent removal rates used in water quality AHL equations since the method allows for a more comprehensive view of the removal rates because it takes into consideration the frequency distribution of the data. It also allows for explicit incorporation of daily removal efficiency.

The effluent removal rate is the percentage of influent POC loading that is removed from the wastewater through all of the Plant processes. The effluent concentration value used to calculate the final effluent removal efficiency is the POC concentration value taken at the NPDES final effluent sample point.   Calculations for all the final effluent removal efficiencies for each POC are presented in Appendix E.

The third decile effluent removal efficiency is calculated as follows:

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[18] *In-Plant Copper Reduction and Treatment Processes Optimization Program at the San Jose/Santa Clara Water Pollution Control Plant*, Environmental Services Department, City of San Jose, December 1998, pg. 2-8

TABLE 5-2
Removal Rates for POCs

Pollutants of Concern	Primary Effluent Removal Rate		3rd Decile Effluent Removal Rate		Biosolids-Based Removal Rates	
	Removal Rate	Source	Removal Rate	Source	Removal Rate	Source
Antimony	NR	NA	0%	Assumed	100%	Assumed
Arsenic	0%	Assumed	53%	Third Decile Removal Efficiency	55%	Average Daily Removal Efficiency
Beryllium	NR	NA	55%	Mass balance	55%	Mass balance
Cadmium	15%	EPA Guidance	71%	Third Decile Removal Efficiency	81%	Average Daily Removal Efficiency
Chromium (Total)	27%	EPA Guidance	89%	Third Decile Removal Efficiency	89%	Average Daily Removal Efficiency
Copper	43%	BNR Study	97%	Third Decile Removal Efficiency	97%	Average Daily Removal Efficiency
Cyanide	27%	EPA Guidance	0%	Assumed	NR	Average Daily Removal Efficiency
Lead	57%	EPA Guidance	88%	Third Decile Removal Efficiency	90%	Average Daily Removal Efficiency
Manganese	NR	NA	98%	Mean Removal Efficiency Method	NR	NA
Mercury	10%	EPA Guidance	99%	Third Decile Removal Efficiency	99%	Mean Removal Efficiency Method
Molybdenum	NR	NA	NR	NA	37%	Mean Removal Efficiency Method
Nickel	23%	BNR Study	50%	Third Decile Removal Efficiency	55%	Average Daily Removal Efficiency
Selenium	NR	NA	71%	Third Decile Removal Efficiency	74%	Average Daily Removal Efficiency
Silver	NR	NA	95%	Third Decile Removal Efficiency	96%	Average Daily Removal Efficiency
Zinc	27%	EPA Guidance	83%	Third Decile Removal Efficiency	84%	Average Daily Removal Efficiency
Total Phenol	8%	EPA Guidance	77%	Third Decile Removal Efficiency	NR	NA
Xylene	NR	NA	0%	Health and Safety Code	NR	NA

NR = Removal Rate Not Required for AHL Calculations.
NA = not applicable.

$$ERE = \frac{(I - E)}{I}$$

Where:

ERE = Effluent removal efficiency for each daily influent and effluent pair (%).
I = Influent Concentration (mg/L).
E = Effluent Concentration (mg/L).

Where influent and effluent data pairing could not provide the necessary concentration values above the detection limit to calculate the removal rate, the 2004 USEPA Guideline Manual literature values were used.

After calculating removal efficiencies for each daily influent and effluent pair, the removal efficiency values were ranked from lowest to highest. Next the third decile value was determined based upon the number of samples. The daily removal efficiency was determined by using linear regression based on the sample rank and corresponding removal efficiencies. This calculated ranked value is the removal rate.

This local limits evaluation used the more conservative third decile removal rates for water quality criteria and inhibition AHL, rather than the median or fifth decile. The use of the third decile assumes that the removal rate will be less than average; therefore, the resulting calculations will be more conservative.

5.4.3   Effluent Removal Rate for Biosolids-based AHL

The calculations based on biosolids quality, such as the anaerobic digester inhibition AHL and biosolids-based AHL, included effluent removal rates based on either the average daily removal efficiency or mean removal efficiency methods. If eight or more influent and effluent data pairs were available, then the final removal rate calculations used the average daily efficiency method. Otherwise, the mean removal efficiency was used. Either of these two methods was more applicable than the third decile method for calculating the final effluent removal rate for biosolids-based AHLs since biosolids quality is not as variable as influent water quality. Also, since the average daily removal rate or mean removal efficiencies are higher than the third decile, the resulting biosolids-based AHLs will be more conservative. If influent or effluent data pairs were not available, then a 100 percent removal rate was assumed for biosolids-based AHLs.

5.4.3.1 Average Daily Efficiency Method

Similar to the third decile removal efficiency method, the average daily effluent removal rate requires calculation of removal efficiencies based on paired influent and effluent data. However, this method calculates the removal rate by averaging the resulting removal efficiencies. This average of the removal efficiencies yields the biosolids-based final effluent removal rate for the final effluent.

$$BBERR_a = \frac{\sum_{N}^{1} (I_i - E_i)/I_i}{N}$$

Where:

BBERR$_a$ = biosolids-based effluent removal rate.
I$_i$ = ith individual influent concentration sample result (mg/L).
E$_i$ = ith individual effluent concentration sample result (mg/L).
N = Total number of paired influent and effluent sample results.

5.4.3.2 Mean Efficiency Effluent Removal Rate

Some POCs did not have enough paired data to calculate a statistically robust final effluent removal rate based on individual removal efficiencies. This mean efficiency effluent removal rate method requires first averaging all influent sample results and all the effluent sample results before calculating the removal rate of these averaged values.

$$BBERR_m = \frac{\dfrac{\sum I_i}{N} - \dfrac{\sum E_i}{N}}{\dfrac{\sum I_i}{N}}$$

Where:

BBERR$_m$ = biosolids based effluent removal rate using the mean efficiency method.
I$_i$ = ith individual influent concentration sample result (mg/L).
Ei = ith individual effluent concentration sample result (mg/L).
N = Total number of paired influent and effluent sample results.

5.4.4 Xylene Removal Rate

The xylene criterion functions to protect the health and safety of workers from toxicity exposure. Therefore, all waste streams must satisfy the health and safety criteria. Thus, the removal rate for xylene was set at 0% to represent a worst case scenario.

5.5 Safety Factors

Because of the considerable amount of high-quality historical concentration data, the USEPA 2004 Guidance Manual recommends a 10 percent safety factor be used in the AHL calculations.

5.6 Calculating AHL

The AHL is calculated from the POC concentration criteria with the corresponding removal rates and safety factors. An AHL is the estimated maximum loading of a pollutant that can be received at a POTW's headworks that should not cause a POTW to violate a particular treatment plant limit or environmental criterion. An AHL is developed to prevent interference or pass through. An AHL is calculated for each applicable criterion: pass through, biosolids contamination, air quality standards, and the various forms of

interference (biological treatment inhibition, sludge digestion inhibition). The AHLs for each POC are calculated based on the various suitable environmental criteria, plant flow rates, and plant removal efficiency. After calculating a series of AHLs for each POC, the lowest AHL is chosen as the MAHL. Table 5-3 presents the different AHLs and the MAHLs associated with pass through, biosolids contamination, air quality standards, and the various forms of interference.

5.6.1 Water Quality Criteria AHL

Water quality criteria AHLs were calculated for each POC. Water quality AHL calculations for all POCs are presented in Appendix F. Water quality criteria were obtained from either the Plant's NPDES permit value or the CTR. Neither the NPDES Permit nor CTR contain water quality criterion for beryllium or manganese. Therefore, as was done for the 1994 local limits evaluation, the beryllium and manganese water quality criteria were obtained from Basin Plan criteria to protect agricultural water supply.

$$WQAHL = \frac{8.34 \times C_{wqc} \times Q_{avg} \times (1 - SF)}{(1 - 3rdERR)} \qquad (4)$$

Where:

WQAHL	=	AHL based on water quality criteria (ppd).
Cwqc	=	monthly average POC water quality criteria (mg/L).
8.34	=	unit conversion factor.
Qavg	=	influent average annual flow (mgd).
SF	=	safety factor.
3rdERR	=	third decile effluent removal rate for each POC.

5.6.2 Plant Inhibition

Pollutant levels in wastewater or biosolids may cause operational problems for biological treatment processes involving secondary and tertiary treatment. Disruption of a POTW's biological processes is referred to as inhibition and can interfere with a POTW's ability to remove BOD and other pollutants. A POTW should assess any past or present operational problems related to inhibition through the local limits review process.

5.6.2.1 Plant Inhibition Criteria

The USEPA 2004 Guidance Manual states POTWs may not need to calculate AHLs to protect against inhibition if current loadings are acceptable to the treatment work's biological processes. However, a POTW may still choose to calculate AHLs based on biological process inhibition criteria to prevent future loadings that may cause inhibition. The Guidance Manual provides literature-based inhibition criteria for activated sludge, nitrification, and anaerobic digestion. However, the Plant's treatment processes combine activated sludge and nitrification into one step in the BNR process. Since the combined system contains some of the same biomass, such as nitrifying bacteria, as traditional activated sludge treatment followed by nitrification processes—this evaluation used the lowest applicable USEPA 2004 Guidance Manual criteria given for either the activated sludge or nitrification process as the initial basis for selecting inhibition criteria. Since the

Plant processes also include anaerobic digestion, these inhibition values were also included in the analysis.

Furthermore, the Guidance Manual prefers using site-specific inhibition criteria. This evaluation used the Plant influent historical data for copper and zinc to estimate site-specific inhibition values. The University of Wisconsin-Madison reported BNR inhibition values for chromium (0.25 ppm), copper (0.1-0.5), nickel (0.25-3.0 mg/L), and zinc (3 mg/L)[19]. These inhibition values were used to confirm the appropriateness of the site-specific inhibition values. Appendix G lists the different criteria available and resulting inhibition values used in this evaluation.

5.6.2.2 Activated Sludge Inhibition AHL

The equation below was used to calculate the activated sludge inhibition AHL. These calculations used primary removal rates to better represent the pollutants entering the activated sludge process stage.   Appendix G presents a table of all inhibition AHL calculations.

$$ASIAHL = \frac{8.34 \times C_{ASI} \times Q_{avg} \times (1 - SF)}{(1 - PRR)}$$

Where:

ASIAHL = activated sludge inhibition AHL (ppd).
C_{ASI} = activated sludge inhibition Limit Concentration (mg/L).
Q_{avg} = Plant's average flow rate (mgd).
PRR = primary effluent removal rate.
SF = safety factor (%).
8.34 = conversion factor.

5.6.2.3 Nitrification Inhibition AHL

The equation below was used to calculate the nitrification inhibition AHL. Since the Plant performs nitrification in one stage in the BNR processes, the AHL calculations use primary removal rates for better representation.

$$NIAHL = \frac{8.34 \times C_{NI} \times Q_{avg} \times (1 - SF)}{(1 - PRR)}$$

Where:

NIAHL = nitrification inhibition AHL (ppd).
C_{NI} = nitrification inhibition limit concentration (mg/L).
Q_{avg} = Plant's average flow rate (mgd).
PRR = primary removal rate.
SF = safety factor (%).
8.34 = conversion factor.

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[19] "Biological Nutrient Removal" slideshow, Jim K. Park, University of Wisconsin-Madison, slide 52.

5.6.2.4 Anaerobic Digester Inhibition AHL

The equations below were used for calculating anaerobic digester inhibition AHLs. The anaerobic digester AHL uses the biosolids-based effluent removal rates. The 2004 USEPA Guidance Manual provides an equation for conservative pollutants, such as metals. The conservative pollutants anaerobic digester inhibition AHL equation is:

$$\text{ADIAHL} = \frac{8.34 \times \text{C}_{\text{ADI}} \times \text{SQ}_{\text{avg}} \times (1 - \text{SF})}{\left(\text{BSERR}\right)}$$

Where:

ADIAHL = anaerobic digester inhibition AHL (ppd).
C_{ADI} = anaerobic digester inhibition standard concentration (mg/L).
SQ_{avg} = Plant average sludge flow rate to digestors (0.84 mgd)
SF = safety factor.
BSERR = biosolids effluent removal rate.

5.6.3 Biosolids-based AHL

In February 1993, EPA issued the Part 503 Biosolids regulations governing the use or disposal of sewage sludge. Pollutant levels were established for three disposal alternatives: land application to condition the soil or fertilize crops grown in the soil, surface disposal for final disposal, and incineration. The pollutant levels, however, are different for each alternative. In addition to the Federal standards, California may apply state hazardous criteria depending upon the ultimate biosolids application. Regardless of how a POTW disposes of biosolids, POTWs may wish to consider using land application "clean sludge" values from 40 CFR 503.13 in their calculation of AHL. Use of these criteria can improve a POTW's beneficial use options for disposal of biosolids. The further achievement of these standards is consistent with the objectives of the National Pretreatment Program, which are listed at 40 CFR 403.2.

The Plant seeks to maximize the opportunities for beneficial use to the maximum extent practicable, which may include application to agricultural land, forest, public contact site, reclamation site, lawn or garden, and landfill. According the 2004 Guidelines, the biosolids criteria to be used for these applications are:

- "Clean Sludge" Pollutant Concentration Limits contained in Table 1 (Ceiling Concentrations) in 40 CFR 503.13 (1995),

- "Clean Sludge" Pollutant Concentration Limits contained in Table 3 (Monthly Average Pollutant Concentrations) in 40 CFR 503.13 (1995),

- Surface disposal limits for 0 to 25 feet from the boundary of an active surface disposal site contained in Table 1 and 2 in 40 CFR 503.23 (1995),

- California Hazardous Waste Total Threshold Limit Concentration, contained in tables in Title 22, Division 4.5, Chapter 11, Article 3, §66261.24

The equation below was used to calculate the biosolids-based AHLs:

$$BSAHL = \frac{0.0022 \times C_{BS} \times Q_{BS}}{BBERR} \times (1 - SF)$$

Where:

BSAHL	=	AHL based on biosolids criteria (ppd)
C_{BS}	=	biosolid or sludge standard dry weight (mg/kg).
Q_{BS}	=	sludge disposal rate (metric tons per day)
BBERR	=	sludge-based final effluent removal rate.
SF	=	safety factor (%).
0.0022	=	conversion factor.

Appendix H includes biosolids criteria, concentration data and calculations used for this evaluation. All of the biosolids criteria were converted to dry weight for use in AHL calculations and to compare with dry weight sludge samples.

5.6.4 OSHA Health and Safety AHL

Only the Xylene AHL is based upon OSHA Health and Safety Criteria. The Health and Safety AHL is calculated as follows:

$$HSAHL = \frac{8.34 \times C_{HS} \times Q_{avg}}{(1 - 0)} \times SF$$

Where

HSAHL	=	anaerobic digester inhibition AHL (ppd).
C_{HS}	=	anaerobic digester inhibition standard concentration (mg/L).
Q_{avg}	=	plant average flow rate.
SF	=	safety factor.

Appendix I includes xylene criteria, concentration data and calculations used for this evaluation.

5.7 Selecting MAHLs

Protecting water quality, biosolids quality, and air quality requires selection of the lowest AHL value for each potential POC for use as the maximum allowable headworks loading. Table 5-3 lists the AHLs that will serve as MAHLs for this evaluation.

5.8 Identifying POCs Requiring New or Revised Local Limits

The 2004 USEPA Guidance states that once a POTW has calculated MAHLs for all of its POCs, it can determine for which pollutants it will require local limits. In making this pollutant-by-pollutant evaluation, the POTW will also want to consider historical issues and the degree to which current influent loadings approach calculated MAHLs. For example,

TABLE 5-3
POCs AHLs and MAHLs

Pollutants of Concern	Water Quality Criteria (ppb)	Water Quality AHL (ppd)	Activated Sludge Inhibition Criteria (ppb)	Activated Sludge Inhibition AHL (ppd)	Nitrification Inhibition Criteria (ppb)	Nitrification Inhibition AHL (ppd)	Anaerobic Digestion Inhibition Criteria (ppb)	Anaerobic Digestion Inhibition AHL (ppd)	Biosolids Criteria (mg/kg)	Biosolids AHL (ppd)	MAHL (ppd)
Antimony	4300	3800	-	-	-	-	-	-	700	160	160
Arsenic	36	67	100	88	1500	1300	1600	18	30	13	13
Beryllium	100	194	-	-	-	-		-	100	43	43
Cadmium	7.3	22	1000	1000	5200	5400	20000	160	39	11	11
Chromium (Total)	200	1600	1000	1200	250	300	110000	780	200	100	100
Copper	12	350	1000	1500	150	240	40000	260	1500	400	240
Cyanide	1.0	0.88	100	120	340	410	1000	6.3	-	-	0.88
Lead	8.52	65	1000	2000	500	1000	340000	2400	300	80	65
Manganese	200	9300	-	-	-	-	-	-	-	-	9300
Mercury	0.012	0.92	100	97	-	-	-	-	17	4.0	0.92
Molybdenum	-	-	-	-	-	-	-	-	75	48	48
Nickel	25	44	1000	1100	250	280	10000	110	210	90	44
Selenium	5.0	15	-	-	-	-	-	-	100	32	15
Silver	2.24	43	-	-		-	13000	85	700	170	43
Zinc	170	880	530	640	530	640	400000	3000	2800	800	640
Total Phenol	4600000	18000000	50000	47600	4000	3800	-	-	-	-	3800
Xylene*	-	-	-	-	-	-	-	-	-	-	1200

*Derived from Health & Safety Criterion

the concentration of some pollutants in the POTW influent may be far below the calculated MAHLs. These pollutants are unlikely to cause problems for the POTW, so the treatment works may conclude that local limits for them are unnecessary. EPA recommends that the POTW document such decisions and discuss them with its Approval Authority, as needed.

Identifying those POCs requiring new or revised local limits is performed by comparing the Plant's influent loading for each POC to its corresponding MAHL. If the influent loading comparison to the MAHL does not meet the screening criteria, then the local limit may need to be revised.

5.8.1 Comparing Threshold Limits to POCs

The 2004 USEPA Guidance Manual recommends that local limits are needed when the following thresholds are satisfied:

- Average influent loading of a toxic pollutant exceeds 60 percent of the MAHL, or

- Maximum daily influent loading of a toxic pollutant exceeds 80 percent of the MAHL any time in the 12-month period preceding the analysis, or

- Monthly average influent loading exceeds 80 percent of average design capacity for BOD, TSS, and ammonia during any one month in the 12-month period preceding the analysis.

The Guidance Manual offers the following guidance on this comparison between MAHLs and headworks loading where local limits have not been established:

- If the current POC headworks loading exceeds the MAHL, USEPA recommends that the POTW establish a local limit for the pollutant to investigate the cause of elevated loading, increase its industrial users monitoring, identify any non-complying industries, and consider undertaking pollution prevention efforts.

- If the current POC headworks loading exceeds the threshold values for the first time (i.e., the loading was below the threshold value during the year before), USEPA recommends that the POTW increase monitoring for the POC or establish a local limit for it.

- If the current POC headworks loading exceeds the threshold value for the second time, USEPA recommends establishing a local limit and increasing POC monitoring.

- If the current headworks loading is below the threshold, USEPA recommends that the POTW review the pollutant's loading as part of its preparation of next year's annual report.

Similarly, USEPA recommends the following guidance for POCs with established local limits:

- If the current POC headworks loading exceeds the MAHL, USEPA recommends revising the local limits (unless an investigation reveals that the

elevated loading is due to an unusual, one-time event), investigating the cause of the high loading, identifying any industries in non-compliance, increasing monitoring of industrial users, and considering adopting pollution prevention efforts.

- If the current POC headworks loading has increased significantly from the previous year (e.g., from 55 percent to 75 percent of the MAHL), USEPA recommends that the POTW investigate the cause of the increased loading, increase the monitoring for the POC, or revise the local limit.

- If the current headworks loading is below the threshold, USEPA recommends that the POTW review the pollutant's loading as part of its preparation of next year's annual report.

Table 5-4 presents a comparison of MAHLs, threshold screening values, and influent loading to determine whether there is a the need to revise or implement new local limits for each POC. If the respective influent loading was above the corresponding screening value, then a new or revised local limit may be required. If the respective influent loading was below the corresponding screening value, then the local limit was protective.

Table 5-5 summarizes the results of the threshold-screening analysis for all of the POCs. None of these screening values was exceeded, indicating that new or lowered local limits are not warranted at this time. Moreover, data for many of the POCs indicate there is ample headworks loading capacity for these contaminants, and their corresponding industrial local limits maybe decidedly conservative. Most concentration data for cyanide is below the limit of detection; therefore, it is not possible to determine if threshold-screening values were satisfied to indicate the need for new or revised limits.

5.8.2 Review of Local Limits Below Threshold Criteria and Recommended Modifications

Local limits that were significantly below the threshold-screening values were further evaluated to determine their suitability as industrial limitations. Secondly, the applicability of copper and nickel local limits were evaluated since these limitations were specifically developed over a decade ago under special circumstances. Finally, local limits were evaluated against California hazardous criteria to determine their applicability to these regulations. These evaluations also took into account how changing the local limit could ultimately impact air, biosolids or water quality requirements now and those anticipated in the near future.

TABLE 5-4
Comparison of MAHLs to Local Limit Screening Values

Pollutants of Concern	MAHL Value	60% MAHL Screening Value (A)	2002-2004 Mean Influent Loading (B)	New or Revised Local Limit Required (B > A)	80% MAHL Screening Value (C)	2004 Maximum Influent Loading (E)	New or Revised Local Limit Required (E > C)
Antimony	160	100	0.7	No	130	1.4	No
Arsenic	13	8.0	2.1	No	10	2.0	No
Beryllium	43	26	0.15	No	34	0.19	No
Cadmium	11	7.0	0.29	No	8.8	0.38	No
Chromium (Total)	100	60	7.1	No	80	11	No
Copper	240	140	93	No	190	140	No
Cyanide	0.88	0.53	<5	Indeterminate	0.70	<5	Indeterminate
Lead	65	39	6	No	52	9	No
Manganese*	9300	5600	98	No	7400	120	No
Mercury	0.92	0.55	0.30	No	0.74	0.46	No
Molybdenum*	48	29	15	No	38	28	No
Nickel	44	26	14	No	35	19	No
Selenium	15	9.0	2.0	No	12	4.4	No
Silver	43	26	2.7	No	34	4.4	No
Zinc	640	380	330	No	510	330	No
Total Phenol	3800	2300	21	No	3000	11	No
Xylene (Total)	1200	720	<0.4	No	960	<0.4	No

*Loading data for manganese and molybdenum from a 2005 special sampling study.

All MAHLs and screening values in ppd.

TABLE 5-5
MAHL Threshold Screening Results

MAHL Threshold Criteria Screening Results	POCs Screened	Actions Recommended
Pollutants below MAHL threshold criteria that do not have a local limit.	Molybdenum	Local Limit not necessary.
Pollutants below MAHL threshold criteria that have a local limit.	Antimony, arsenic beryllium, cadmium, copper, chromium, lead, nickel, manganese, mercury, selenium, silver, zinc, total phenol, xylene	Evaluate further to determine if local limit is still necessary or should be increased.
Pollutants above MAHL threshold criteria that do not a have local limit.	None	Evaluate further to determine if a local limit is required.
Pollutants above MAHL threshold criteria that a have local limit.	None	Evaluate further to determine if update to a local limit is necessary.
Pollutants with indeterminate results as a result of analytical detection limitations	Cyanide	Evaluate further to determine whether local limit modification is necessary

5.8.2.1 Antimony

Antimony is increasingly being used in the semiconductor industry in the production of diodes, infrared detectors, and Hall-effect devices. As an alloy, this semi-metal greatly increases lead's hardness and mechanical strength. The most important use of antimony metal is as a hardener in lead storage batteries. Antimony alloys are used in lead storage batteries, solder, sheet and pipe metal, bearings, castings, ammunition, and pewter. High-purity antimony is used as a doping agent in semiconductors. Intermetallic compounds of antimony are used for thermoelectric devices such as infrared detectors and diodes. The most common end-use of antimony compounds is antimony trioxide for fire retardation for plastics, textiles, rubber, adhesives, pigments, and paper.[20]

Antimony has an industrial local limit of 5 mg/L. The antimony MAHL was calculated to be 160 ppd. The 2002-2004 mean influent loading of 0.7 ppd was significantly lower than the corresponding 60% threshold screening value of 100 ppd. The 2002-2004 mean influent loading for antimony represents 0.69% of the MAHL-based trigger value. Likewise, the 2004 maximum influent loading of 1.4 ppd was significantly lower than the corresponding 80% threshold screening value of 130 ppd. The 2004 maximum influent loading for antimony represents 1.1% of the MAHL-based trigger value. Since the corresponding influent loadings were found to be much lower than the recommended 60% and 80% threshold screening values, the antimony local limit does not warrant modification at this time.

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[20] "Chemical Backgrounders, Antimony", National Safety Council website, http://www.nsc.org/library/chemical/antimony.htm

The City's pretreatment program has one facility with antimony limits permitted as part of the federal categorical limits under 40 CFR 437 Subpart A. The California hazardous waste STLC limit for antimony is 15 mg/L.

A review of industrial user permits determined that one permitted user has been issued an antimony limit during the past five years. The City does not possess current sector analysis loading data for antimony. The 1994 local limits analysis assumed zero contribution from both the residential and commercial sectors. This evaluation also assumed that industry accounts for 100% of the sector loading for antimony. Based on this assumption, the maximum allowable industrial loading would be equal to the MAHL of 160 ppd. If one assumes this allocation to be distributed equally to all industrial users, a revised local limit could be estimated at 2.5 mg/L. This estimate is quite comparable to the current local limit for antimony.

Since much of the forgoing analysis is predicated upon many conservative assumptions and insufficient information, the City recommends that the current industrial local limit for antimony be retained at 5 mg/L.

5.8.2.2 Beryllium

Very pure gem-quality beryllium is better known as either aquamarine or emerald. Pure beryllium metal is used to make aircraft disc brakes, nuclear weapons and reactors, aircraft, satellites, space vehicle structures and instruments, X-ray transmission windows, missile parts, fuel containers, precision instruments, rocket propellants, navigational systems, heat shields, and mirrors. Beryllium oxide is used to make specialty electrical and high technology ceramics, electronic heat sinks, electrical insulators, microwave oven components, gyroscopes, military vehicle armor, rocket nozzles, and laser structural components. Beryllium alloys are used in electrical connectors and relays, springs, precision instruments, aircraft engine parts, non-sparking tools, submarine cable housings and pivots, wheels, and pinions.[21]

Beryllium has an industrial local limit of 0.75 mg/L. The beryllium MAHL was calculated to be 43 ppd.   The 2002-2004 mean influent loading of 0.15 ppd was significantly lower than the corresponding 60% threshold screening value of 26 ppd. The 2002-2004 mean influent loading for beryllium represents 0.58% of the MAHL-based trigger value. Likewise, the 2004 maximum influent loading of 0.19 ppd was significantly lower than the corresponding 80% threshold screening value of 34 ppd. The 2004 maximum influent loading for beryllium represents 0.56% of the MAHL-based trigger value. Since the corresponding influent loadings were found to be much lower than the recommended 60% and 80% threshold screening values, the beryllium local limit does not warrant modification at this time.

There are no federal categorical limits for beryllium in either 40 CFR 433 or 40 CFR 469, the categorical criteria most common among the Plant's significant industrial users. The California hazardous waste STLC limit for beryllium is 0.75 mg/L, identical to the current industrial limitation.

A review of industrial user permits determined that no permitted user has been issued a beryllium limit during the past five years. As with antimony, the City does not possess current sector analysis loading data for beryllium. The 1994 local limits analysis assumed

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[21] "Chemical Backgrounders, Beryllium", National Safety Council website, http://www.nsc.org/library/chemical/Berylliu.htm

zero contribution from both the residential and commercial sectors. This evaluation also assumed that industry accounts for 100% of the sector loading for antimony. Based on this assumption, the maximum allowable industrial loading would be equal to the MAHL of 34 ppd. If one assumes this allocation to be distributed equally to all industrial users, a revised local limit could be estimated at 0.52 mg/L. This estimate is quite comparable to the current local limit for beryllium.

Since much of the forgoing analysis is predicated upon many conservative assumptions and insufficient information, the City recommends that the current industrial local limit for beryllium be retained at 0.75 mg/L.

5.8.2.3 Copper

Copper is used as a metal for electrical and electronic products in building construction; industrial machinery and equipment; and heating, chemical, and pharmaceutical machinery. It is used in alloys, inorganic pigments, electroplated protective coatings and undercoatings, cooking utensils, corrosion-resistant piping, insulation for liquid fuels, coins, cement, food and drugs, metallurgy, nylon, paper products, dyes, pollution control devices, printing and photocopying, pyrotechnics, wood preservatives, insecticides, fungicides, and herbicides. It is also used to manufacture anti-fouling paints, corrosion inhibitors, electrolysis and electroplating processes, fabric and textiles, flameproofing, fuel additives, glass, and ceramics.[22]

All facilities also have local limit permit limits. Copper industrial local limits are developed based on a three-tiered system (Group I, II and III). All dischargers must meet a maximum allowable concentration limit of 2.7 mg/L. Group I dischargers have individualized, site-specific limits based upon mass audit studies. Group II dischargers must either meet a daily maximum limit of 1.0 mg/L or a monthly average limit of 0.5 mg/L. Group III dischargers must meet the maximum allowable concentration limit of 2.7 mg/L.

The copper MAHL was calculated to be 240 ppd.   The 2002-2004 mean influent loading of 93 ppd was lower than the corresponding 60% threshold screening value of 140 ppd. The 2002-2004 mean influent loading for copper represents 67% of the MAHL-based trigger value. Likewise, the 2004 maximum influent loading of 140 ppd was lower than the corresponding 80% threshold screening value of 190 ppd. The 2004 maximum influent loading for copper represents 74% of the MAHL-based trigger value. Since the corresponding influent loadings were found to be lower than the recommended 60% and 80% threshold screening values, the copper local limit does not warrant modification at this time.

There are Federal categorical limits for copper. 40 CFR 433 contains daily maximum and monthly average industrial limits for copper of 3.38 mg/L and 2.70 mg/L, respectively. The California hazardous waste STLC limit for copper is 25 mg/L.

The evaluation of copper influent loading relative to the corresponding MAHL-based threshold trigger values demonstrated that there is no need to make these industrial limits more stringent. As described earlier, the current local limits for copper consist of a complex tiered approach, which is costly and time consuming to implement. Therefore, the City evaluated the appropriateness of the tiered limits to determine if the existing approach

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[22] "Chemical Backgrounders, Copper", National Safety Council website, http://www.nsc.org/library/chemical/copper.htm

could be replaced with uniform concentration limits that would be applicable to all industrial dischargers. Chapter 7 of this report describes this analysis in more detail.

5.8.2.4 Cyanide

Cyanide salts are mainly used in electroplating, metallurgy, and the production of organic chemicals; in photographic development; as anti-caking agents in road salts; in the extraction of gold and silver from ores; and in the making of plastics. Minor uses of cyanide salts include use as insecticides and rodenticides, as chelating agents, and in the manufacture of dyes and pigments.[23]

Cyanide has an industrial local limit of 0.5 mg/L. The cyanide MAHL was calculated to be 0.88 ppd. The MAHL was based on the 1 µg/L CTR water quality objective for cyanide. Since most influent and effluent concentration measurements were below the limit of detection, the removal rate was assumed to be zero. This assumption results in the calculation of a very conservative MAHL. Furthermore, since most concentration measurements were below detection level, influent and effluent loading could only be estimated and a further analysis of the local limit based on the MAHL process loading could not proceed.

There are Federal categorical limits for cyanide. 40 CFR 433 contains daily maximum and monthly average industrial limits for cyanide of 1.2 mg/L and 0.65 mg/L, respectively. There is no California hazardous waste STLC limit for cyanide.

As discussed in Chapter 4, the Plant experienced pass-through events for cyanide in 2004 and 2005 due to unlawful discharges. The City does not possess current sector analysis loading data for cyanide. The following discussion assumed zero contribution from both the residential and commercial sectors. This evaluation assumed that industry accounts for 100% of the sector loading for cyanide. Based on this assumption, the maximum allowable industrial loading would be equal the MAHL of 0.88 ppd. If one assumes distribution of this allocation equally to all industrial users, a revised local limit could be estimated at 0.01 mg/L. However, a local limit this low would be unrealistic to implement in the industrial sector.

Moreover, since much of the forgoing analysis is predicated upon many conservative assumptions and insufficient information, the City recommends that the current industrial local limit for cyanide be retained at 0.5 mg/L. The Plant will continue to monitor cyanide loading in the future, and will encourage industrial compliance through education and outreach programs, as well as through surveillance monitoring for illegal discharge.

5.8.2.5 Manganese

Most manganese is used to produce ferromanganese, or metallic manganese, which is used in the production of steel to improve hardness, stiffness, and strength. It is used in carbon steel, stainless steel, high-temperature steel, and tool steel, along with cast iron and superalloys. Manganese dioxide is commonly used in production of dry-cell batteries, matches, fireworks, porcelain and glass-bonding materials, amethyst glass, and as the starting material for production of other manganese compounds. Manganese chloride is used as a precursor for other manganese compounds, as a catalyst in the chlorination of

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[23] [23] Chemical Backgrounders, Cyanide Compounds", National Safety Council website, http://www.nsc.org/library/chemical/Cyanide_.htm

organic compounds, in animal feed to supply essential trace minerals, and in dry-cell batteries. Manganese sulfate is used in glazes, varnishes, ceramics, and fertilizers; as a fungicide; and as a nutritional supplement.

Manganese has an industrial local limit of 35 mg/L. The manganese MAHL was calculated to be 9300 ppd. The 2002-2004 mean influent loading of 98 ppd was significantly lower than the corresponding 60% threshold screening value of 5600 ppd. The 2002-2004 mean influent loading for manganese represents 1.8% of the MAHL-based trigger value. Likewise, the 2004 maximum influent loading of 120 ppd was significantly lower than the corresponding 80% threshold screening value of 7400 ppd. The 2004 maximum influent loading for manganese represents 1.6% of the MAHL-based trigger value. Since the corresponding influent loadings were found to be much lower than both the recommended 60% and 80% threshold screening values, the manganese local limit does not warrant modification at this time.

None of the federal categorical facilities have permit limits for manganese. There is no California hazardous waste STLC limit for manganese.

A review of industrial user permits determined that one permitted user has been issued a manganese limit during the past five years. The City does not possess current sector analysis loading data for manganese. The following discussion assumed zero contribution from both the residential and commercial sectors. This evaluation assumed that industry accounts for 100% of the sector loading for manganese. Based on this assumption, the maximum allowable industrial loading would be equal to the MAHL of 9300 ppd. If one assumes this allocation to be distributed equally to all industrial users, a revised local limit could be estimated at 140 mg/L. This estimate is significantly above the current local limit of 35 mg/L.

This local limits analysis has concluded that manganese influent loadings for 2005 did not exceed any of the MAHL-based threshold screening values. Therefore, according to the 2004 USEPA Guidance Manual, modifications to make the industrial limit more restrictive were not required. Furthermore, a conservative estimate of a MAHL-derived industrial limit for manganese would result in quite high limitation at 140 mg/L.   While this limitation by definition would be protective of water, biosolids and air quality regulation, there appears little relevance for implementing an industrial local limit for manganese in our service area.   In addition, manganese has never been considered a pollutant of concern for the collection system or the treatment facility. Therefore, the City recommends that the current industrial local limit for manganese be deleted.

5.8.2.6   Nickel

Nickel is used to make steels and alloys, permanent magnet materials, and nickel-cadmium batteries, and in electroplating and ceramics. Fuel oil combustion leads to releases of nickel to the atmosphere. Other sources include emissions from mining and refining operations, municipal waste incineration, and windblown dust. Minor sources of atmospheric nickel are volcanoes, steel production, gasoline and diesel fuel combustion, nickel alloy production, and coal combustion.[24]

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[24] "Chemical Backgrounders, Nickel", National Safety Council website, http://www.nsc.org/library/chemical/Nickel.htm

Nickel industrial local limits are developed based on a three-tiered system (Group I, II and III). All dischargers must meet a maximum allowable concentration limit of 2.6 mg/L. Group I dischargers have individualized site-specific limits based upon mass audit studies. Group II dischargers must either meet a daily maximum limit of 1.1 mg/L or a monthly average limit of 0.5 mg/L. Group III dischargers must meet the maximum allowable concentration limit of 2.6 mg/L.

The nickel MAHL was calculated to be 44 ppd. The 2002-2004 mean influent loading of 14 ppd was lower than the corresponding 60% threshold screening value of 26 ppd. The 2002-2004 mean influent loading for nickel represents 54% of the MAHL-based trigger value. Likewise, the 2004 maximum influent loading of 19 ppd was lower than the corresponding 80% threshold screening value of 38 ppd. The 2004 maximum influent loading for nickel represents 55% of the MAHL-based trigger value. Since the corresponding influent loadings were found to be lower than the recommended 60% and 80% threshold screening values, the nickel local limit does not warrant modification at this time.

There are Federal categorical limits for nickel. 40 CFR 433 contains daily maximum and monthly average industrial limits for nickel of 3.98 mg/L and 2.38 mg/L, respectively. The California hazardous waste STLC limit for copper is 25 mg/L.

The evaluation of nickel influent loading relative to the corresponding MAHL-based threshold trigger values demonstrated that there is no need to make these industrial limits more stringent. As described earlier, the current local limits for nickel consist of a complex tiered approach, which is costly and time consuming to implement. Therefore, the City evaluated the appropriateness of the tiered limits to determine if the existing approach could be replaced with uniform concentration limits that would be applicable to all industrial dischargers. Chapter 7 of this report describes this analysis in more detail.

5.8.2.7 Selenium

Selenium is used for photographic exposure meters; rectifiers for home entertainment equipment; xerography, red or black glass, anti-dandruff shampoos; and pigments in plastics, paints, enamels, inks and rubber. It is also used in veterinary medicine and as a fungicide and insecticide.[25]

Selenium has an industrial local limit of 2.0 mg/L. The selenium MAHL was calculated to be 15 ppd. The 2002-2004 mean influent loading of 2.0 ppd was significantly lower than the corresponding 60% threshold screening value of 9.0 ppd. The 2002-2004 mean influent loading for selenium represents 23% of the MAHL-based trigger value. Likewise, the 2004 maximum influent loading of 4.4 ppd was significantly lower than the corresponding 80% threshold screening value of 12 ppd. The 2004 maximum influent loading for selenium represents 36% of the MAHL-based trigger value. Since the corresponding influent loadings were found to be lower than both the recommended 60% and 80% threshold screening values, the selenium local limit does not warrant modification at this time.

The City's pretreatment program has one facility with antimony limits permitted as part of the federal categorical limits under 40 CFR 437 Subpart A. The California hazardous waste STLC limit for selenium is 1.0 mg/L.

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[25] "Chemical Backgrounders, Selenium", National Safety Council website, http://www.nsc.org/library/chemical/selenium.htm

A review of industrial user permits determined that no permitted user has been issued a selenium limit during the past five years. The City does not possess current sector analysis loading data for selenium. The following discussion assumed zero contribution from both the residential and commercial sectors. This evaluation assumes that industry accounts for 100% of the sector loading for selenium. Based on this assumption, the maximum allowable industrial loading would be equal to the MAHL of 15 ppd. If one assumes this allocation to be distributed equally to all industrial users, a revised local limit could be estimated to be 0.2 mg/L. This estimate is significantly below the current local limit of 2.0 mg/L.

This local limits analysis has concluded that selenium influent loadings for 2002 – 2004 did not exceed any of the MAHL-based threshold screening values. Therefore, according to the 2004 USEPA Guidance Manual, modifications to make the industrial limit more restrictive were not required. However, a conservative estimate of a MAHL-derived industrial limit for selenium would result in a very low limitation at 0.2 mg/L. While this limitation by definition would be protective of water, biosolids and air quality regulation, there appears little incentive to modify the industrial local limit when the treatment facility already meets all applicable environmental regulations with respect to this contaminant.

In this instance, it appears that the industrial local limit for selenium may be under protective. Therefore, the City recommends that the current industrial local limit be lowered to 1 mg/L, equivalent to the California hazardous waste STLC limitation.

5.8.2.8 Xylene

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar. Chemical industries produce xylene from petroleum. It is one of the top 30 chemicals produced in the United States in terms of volume. Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.[26]

Xylene has an industrial local limit of 1.5 mg/L. Xylene can also be regulated through the TTO limit of 2.13 mg/L. The xylene MAHL was calculated to be 1200 ppd. The 2002-2004 mean influent loading of <0.4 ppd was significantly lower than the corresponding 60% threshold screening value of 720 ppd. The 2002-2004 mean influent loading for xylene represents 0.06% of the MAHL-based trigger value. Likewise, the 2004 maximum influent loading of <0.4 ppd was significantly lower than the corresponding 80% threshold screening value of 960 ppd. The 2004 maximum influent loading for xylene represents 0.04% of the MAHL-based trigger value. Since the corresponding influent loadings were found to be much lower than the recommended 60% and 80% threshold screening values, the xylene local limit does not warrant modification at this time.

The City's pretreatment program has one facility with antimony limits permitted as part of the federal categorical limits under 40 CFR 437 Subpart A. There is no California hazardous waste STLC limit for xylene.

A review of industrial user permits determined that one permitted user has been issued a xylene limit during the past five years. The City does not possess current sector analysis loading data for xylene. The following discussion assumed zero contribution from both the

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[26] http://www.atsdr.cdc.gov/tfacts71.html

residential and commercial sectors. This evaluation assumes that industry accounts for 100% of the sector loading for xylene. Based on this assumption, the maximum allowable industrial loading would be equal to the MAHL of 1200 ppd. If one conservatively assumes this allocation to be distributed equally to all industrial users, a revised local limit could be estimated at 18 mg/L. This estimate is significantly above the current local limit of 1.5 mg/L.

This local limits analysis has concluded that xylene influent loadings for 2002 – 2004 did not exceed any of the MAHL-based threshold screening values. Therefore, according to the 2004 USEPA Guidance Manual, modifications to make the industrial limit more restrictive were not required. Furthermore, a conservative estimate of a MAHL-derived industrial limit for xylene would result in a high limitation of 17 mg/L. While this limitation by definition would be protective of water, biosolids and air quality regulation, there appears little relevance for implementing an industrial local limit for xylene in our service area. In addition, xylene has never been considered a pollutant of concern for the collection system or the treatment facility. Therefore, the City recommends that the current industrial local limit for xylene be deleted.

6.0 Evaluating Applicability of Local Limits for Copper and Nickel

The evaluation presented in Chapter 5 comparing copper and nickel influent loadings relative to their respective MAHLs demonstrated that there is no need to make these limits more restrictive. As described earlier, the current local limits for copper and nickel consist of a complex tiered approach, which is costly and time consuming to implement when compared to traditional pretreatment programs. Therefore, the City evaluated the appropriateness of the tiered limits to determine if the existing approach could be replaced with uniform concentration limits that would be applicable to all industrial dischargers. This simple modification to local limits could potentially free up critical resources for reallocation to other pretreatment and pollution prevention program activities. The following discussion describes this analysis in more detail.

The 2004 USEPA Guidance Manual states:

> *A POTW can apply to its controllable sources concentration-based limits (typically in mg/L), or mass-based limits (typically in lb/day), or both.*

> *When applying its local limits, a POTW needs to determine the appropriate limit duration. The POTW may establish limits that are daily maximums, monthly averages, or instantaneous maximums. In general, a POTW should base the limit duration on the type of criteria – long-term or short-term – used to develop the local limit. However, most local limits will be implemented as daily maximums based upon two main factors: 1) the short-term nature of the event that the local limit is protecting against; and 2) the infrequency of IU sampling.*

> *After developing and allocating local limits, POTWs should determine whether their local limits pass a "common sense test." An effective public participation process can help with this assessment.*

6.1 Allocation Scenarios

6.1.1 Sector Loading Studies

Since 1993, the City has completed several technical studies to more accurately determine residential, commercial and industrial sector allocations for copper and nickel. The 1994 local limits study included an evaluation of pollutant contributions from the residential sector using 1993 data. This evaluation used water use records to estimate the residential sector flow rates. Commercial flow rates were estimated by subtracting the sum of the residential and industrial flow rates from the total influent flow to the treatment plant. Tables 6-1 and 6-2 depict these flow rates in the second column of each table, while the third column in each table present the sector loadings.

Industrial loading was based on compliance monitoring data from over 400 permitted dischargers from January to December 2003. In July 1994, pollutant loading for the residential and commercial sectors was based upon focused sampling to estimate the

pollutant contribution from these sectors. The fourth column of Tables 6-1 and 6-2 Nickel depict the loading results of this investigatory effort.

Sampling continued from July 1994 through December 1995. A 1996 Report entitled Commercial-Residential Sampling Program, 1994-1995 Sampling Status Report described the result of this sampling program.

In 2000, the City completed an investigation that used the allocation loading results from 1996 with improved 1997-1999 sector loading information. The residential flow rates were derived by subdividing the residential sector into categories of dwelling types to determine differences in water use and wastewater discharge. The commercial sector water use estimate was calculated from the total number of jobs in four broad commercial sectors and the approximate water use per employee in those sectors. The fifth and sixth columns of Tables 6-1 and 6-2 provide the residential and commercial flow rates and copper and nickel loadings, respectively.

Concentration data from 2004 was also used to estimate sector loadings for this local limits evaluation. Tables 6-1 and 6-2 summarize the results of these studies. This information will be further evaluated to determine the most appropriate residential and commercial sector loading estimates to use for copper and nickel local limits development.

TABLE 6-1
Estimates of Copper Sector Loading Data

Sector	1992-1994 Flow (mgd)	1992 Copper (ppd)	1994 Copper (ppd)	2000 Flow (mgd)	2000 Copper (ppd)	2004 Flow (mgd)	2004 Copper (ppd)
Residential	82.1	36.0	36.0	76.7	37	72.2	28
Commercial	23.1	38.8	21.0	29.1	13.3	35.1.	16
Industrial	8.3	19.9	19.9	11.5	8.6	7.4	4.7
TOTAL	113.5	94.7	76.9	117.3	51.3	114.7	49
Plant Influent	--	99.3	99.3	120	80.4	114.7	94
Error of Closure	--	4.6%	17.7%	2.2%	36.6%	0%	48%

Sector	1992-1994 Flow (mgd)	1992 Nickel (ppd)	1994 Nickel (ppd)	2000 Flow (mgd)	2000 Nickel (ppd)	2004 Flow (mgd)	2004 Nickel (ppd)
TABLE 6-2 Estimates of Nickel Sector Loading Data							
Residential	82.1	--	2.9	76.7	5.1	72.2	4.8
Commercial	23.1	--	3.8	29.1	3.4	35.1	6.4
Industrial	8.3	--	6.8	11.5	4.8	7.4	2.1
TOTAL	113.5	--	13.5	117.3	13.3	114.7	13.4
Plant Influent	--	--	19.8	120	13.7	114.7	12.7
Error of Closure	--	--	32.8%	2.2%	3.6%	0%	4.8%

6.1.2   Non-Industrial Copper Allocation

Table 6.1 above presents an influent mass balance for the residential, commercial and industrial copper sector loadings. A simple error of closure analysis, comparing total influent loading to the sum of the individual sector loadings, indicates that the mass balance results are relatively high and quite variable. The sector loading results for copper indicates the considerable difficulty inherent when estimating loading from the diverse sources associated with the residential and commercial sectors. The residential and commercial loadings may be highly influenced by the water supply source and copper corrosion of pipes. In addition, these sources are difficult to quantify due to the diversity of sources, intermittent discharges, varying waste characteristics, and the lack of good quality information.

Industrial loading, on the other hand, can be compiled quite accurately from information contained in the City's industrial compliance monitoring database. Therefore, this evaluation chose to use industrial loading calculated from concentration and flow data from over 400 permitted dischargers collected between 2002 and 2004. The average annual industrial loading and average annual influent loading for copper from 2002 to 2004 is presented in Table 6-3.

Year	Influent Mean Loading (ppd)	Industrial Loading (ppd)
TABLE 6-3 Copper Industrial and Influent Mean Annual Loading		
2002	92	2.9
2003	101	3.1
2004	98	4.7
Mean	**97**	**3.6**

Thus, the mean annual industrial copper loading for 2002 to 2004 is 3.6 ppd. The mean annual influent copper loading for 2002 to 2004 is 97 ppd. An estimate of the non-industrial copper loading (NICL) can then be calculated:

$$NICL = 97 \text{ ppd} - 3.6 \text{ ppd}$$

$$NICL = 93.4 \text{ ppd}$$

This loading information will be used to calculate the maximum allowable industrial loading (MAIL) for copper below.

6.1.3 Non-Industrial Nickel Allocation

Table 6.2 above presents an influent mass balance for the residential, commercial and industrial nickel sector loadings. A simple error of closure analysis, comparing total influent loading to the sum of the individual sector loadings, again indicates that the mass balance results are relatively high and quite variable. The sector loading results for nickel indicates the considerable difficulty inherent when estimating loading from the diverse sources associated with the residential and commercial sectors. The residential and commercial loadings maybe highly influenced by the water supply source and other nickel sources. In addition, these sources are difficult to quantify due to the diversity of sources, intermittent discharges, varying waste characteristics, and the lack of good quality information.

Industrial loading, on the other hand, can be compiled quite accurately from information contained in the City's industrial compliance monitoring database. Therefore, this evaluation chose to use industrial loading calculated from concentration and flow data from over 400 permitted dischargers collected between 2002 and 2004. The average annual industrial loading and average annual influent loading for nickel from 2002 to 2004 is presented in Table 6-4.

TABLE 6-4 Nickel Industrial and Influent Mean Annual Loading		
Year	**Influent Mean Loading (ppd)**	**Industrial Loading (ppd)**
2002	13.3	2.44
2003	13.2	2.68
2004	12.7	2.06
Mean	**13.1**	**2.4**

Thus, the mean annual industrial nickel loading for 2002 to 2004 is 2.4 ppd. The mean annual influent nickel loading for 2002 to 2004 is 13.1 ppd. An estimate of the non-industrial nickel loading (NINL) can then be calculated:

$$NINL = 13.1\ ppd - 2.4\ ppd$$

$$NINL = 10.7\ ppd$$

This loading information will be used to calculate the maximum allowable industrial loading (MAIL) for nickel below.

6.1.4   Copper Local Limits

To determine a local limit for copper, the MAIL for copper must first be calculated. The MAIL for copper is the loading remaining after subtracting the non-industrial loading from the MAHL for copper:

$$MAIL = MAHL - NICL$$

$$MAIL = 240\ ppd - 93.4\ ppd$$

$$MAIL = 150.6\ ppd$$

The industrial local limit for copper (LL) can then be calculated employing the MAIL and the mean annual industrial flow rate (Q_{IND}):

$$LL = \frac{MAIL}{8.34 \times Q_{IND}}$$

$$LL = \frac{146.6\ ppd}{8.34 \times 7.8\ mgd} \tag{14}$$

$$LL = 2.3\ mg/l$$

6.1.4.1 Recommended Copper Limit

This local limits analysis has concluded that copper influent loadings for 2002 – 2004 did not exceed the MAHL-based threshold screening values. Therefore, according to the 2004 USEPA Guidance Manual, modifications to make the industrial limit more restrictive were not required. However, because the copper local limits are implemented based upon a tiered approach that is costly and time consuming to implement, the City elected to evaluate a revised copper limit based upon current technical information and revised regulatory guidance. The resulting MAHL-based limit for copper would be 2.1 mg/L. This limitation by definition would be protective of water, biosolids and air quality regulation.

Therefore, the City recommends the current tiered approach toward industrial pretreatment regulation be replaced with a MAIL-based local limit of 2.3 mg/L for copper. This limitation would be implemented as a maximum allowable concentration limit for all industrial dischargers except as noted below.

The City already regulates many small industrial and commercial facilities that collectively account for less than one percent of the total loading to the Plant. These dischargers are presently regulated as Group III dischargers and must meet an maximum allowable

concentration limit of 2.7 mg/L for copper. The City wishes to maintain already established pollution prevention practices for these facilities while not over burdening them with more restrictive limitations. Therefore, the City proposes that facilities discharging less than 1000 gallons per day would continue to be required to meet a maximum allowable concentration limit of 2.7 mg/L for copper.

6.1.5 Nickel Local Limits

To determine a local limit for nickel, the MAIL for nickel must first be calculated. The MAIL for nickel is the loading remaining after subtracting the non-industrial loading from the MAHL for nickel:

$$MAIL = MAHL - NINL$$

$$MAIL = 44 \text{ ppd} - 10.7 \text{ ppd}$$

$$MAIL = 33.3 \text{ ppd}$$

The industrial local limit for nickel (LL) can then be calculated employing the MAIL and the mean annual industrial flow rate (Q_{IND}):

$$LL = \frac{MAIL}{8.34 \times Q_{IND}}$$

$$LL = \frac{33.3 \text{ ppd}}{8.34 \times 7.8 \text{mgd}} \tag{14}$$

$$LL = 0.5 \text{ mg/l}$$

6.1.5.1 Recommended Nickel Limits

This local limits analysis has concluded that nickel influent loadings for 2002 – 2004 did not exceed the MAHL-based threshold screening values. Therefore, according to the 2004 USEPA Guidance Manual, modifications to make the industrial limit more restrictive were not required. However, because the nickel local limits are implemented based upon a tiered approach that is costly and time consuming to implement, the City elected to recalculate a revised nickel limit based upon current technical information and revised regulatory guidance. The resulting MAHL-based limit for nickel would be 0.5 mg/L. This limitation by definition would be protective of water, biosolids and air quality regulation.

Therefore, the City recommends the current tiered approach toward industrial pretreatment regulation be replaced with a MAIL-based local limit of 0.5 mg/L for nickel. This limitation would be implemented as a maximum allowable concentration limit for all industrial dischargers except as noted below.

The City already regulates many small industrial and commercial facilities that collectively account for less than one-percent of the total loading to the Plant. These dischargers are presently regulated as Group III dischargers and must meet an instantaneous maximum

concentration limit of 2.6 mg/L for nickel. The City wishes to maintain already established pollution prevention practices for these facilities while not over burdening them with more restrictive limitations. Therefore, the City proposes that facilities discharging less than 1000 gallons per day would continue to be required to meet a maximum allowable concentration limit of 2.6 mg/L for nickel.

7.0 Additional Protections for Collection Systems

The 2004 USEPA Guidance Manual states that POTWs may need to develop local limits to address concerns about their collection systems and meet the requirements found at 40 CFR 403.5(b), which include protecting the health and safety of workers at the POTW. The guidance specifically describes the following collection system concerns:

- Fires and explosions,
- Corrosion,
- Flow obstructions,
- Temperature, and
- Toxic gases, vapors and fumes.

As part of the local limits evaluation process, the City also conducted a review of its the sewer ordinance to ensure that these protections were already in place.

7.1 Fires and Explosions

The General Pretreatment Regulations prohibit discharge of pollutants that will create a fire or an explosion in the collection system or the treatment facility. To protect from fires and explosions, the City's sewer use ordinances contain a prohibition on substances having a closed-cup flashpoint of less than 140°F or 60°C.

7.2 Corrosion

To protect the sewer system and treatment facility from corrosive discharges, the General Pretreatment Regulations prohibit discharges that will cause corrosive damage to the collection system and POTWs. The City's sewer use ordinance prohibits discharges with a pH less than 6 or greater than 12.5, or having other corrosive properties capable of causing damage or hazard to the sanitary sewer system or or any personnel operating or maintaining the sanitary sewer systems.

7.3 Flow Obstructions

The discharge of solid or viscous pollutants in amounts that will obstruct the flows to the treatment plant and result in interference is prohibited by the General Pretreatment Regulations. The greatest threat of obstruction at POTWs comes from polar fats, oils and greases of animal and vegetable origin. The City has an Oil & Grease local limit of 150 mg/L and sewer use ordinance language stating that no trash or other solid obstructions shall be discharged into the sanitary sewer system. However, the best prevention measures against grease blockage is proper sizing of grease removal devices and ensuring the maintenance of grease removal devices. For several years now City staff has reviewed food facility plans

and specifications for the appropriate sizing of grease removal devices. In addition, the City has implemented an inspection program for its over 3000+ restaurants and food facilities. This inspection program verifies the installation of grease removal devices, maintenance practices and provides best management practices to educate owners and managers regarding grease removal.

7.4   Temperature

The General Pretreatment Regulations prohibit discharges that will inhibit the biological activity in the POTW and result in interference. In no case can discharges increase the temperature of the headworks above 104oF or 40oC unless the Approval Authority, upon request of the POTW, approves alternative limits. The City's sewer use ordinance already prohibits the discharge of any liquid, solid, vapor, or gas discharges with a temperature of 150 oF or more or that causes the temperature of the Plant to exceed 104oF.

7.5   Toxic Gases and Fumes

The General Pretreatment Regulations prohibit the discharge of pollutants that lead to the accumulation of toxic gases, vapors, or fumes in the POTW in sufficient quantity to cause acute worker health and safety problems. The City's sewer use ordinance already includes a prohibition against the discharge of substances, which results in the presence of toxic gases, vapors   or   fumes   within   the   sanitary   sewer   system.

8.0 Recommendations

Table 8-1 summarizes the recommended modifications to the City's industrial local limits as a consequence of this local limits evaluation.

TABLE 8-1
Local Limit Recommendations

Constituent	Existing Local Limits (mg/l)	Modification
Antimony	5.0	No modification at this time
Arsenic	1.0	No modification at this time
Beryllium	0.75	No modification at this time
Cadmium	0.7	No modification at this time
Chromium, Total	1.0	No modification at this time
Copper	Group 1 – 2.7 maximum allowable and individual limits Group 2 either 1.0 daily maximum or 2.7 maximum allowable and 0.4 annual average Group 3 – 2.7 maximum allowable	Consolidate to one maximum allowable concentration limit of 2.3 mg/L
Cyanide	0.5	No modification at this time
Lead	0.4	No modification at this time
Manganese	35.0	Delete local limit
Mercury	0.010	No modification at this time
Molybdenum	None	No addition at this time
Nickel	Group 1 – 2.6 maximum allowable and individual limits Group 2 either 1.1 daily maximum or 2.6 maximum allowable and 0.5 annual average Group 3 – 2.6 maximum allowable	Consolidate to one maximum allowable concentration limit of 0.5 mg/L
Selenium	2.0	Reduce local limit to 1.0 mg/L
Silver	0.7	No modification at this time
Zinc	2.6	No modification at this time.
Total Phenol	30	No modification at this time.
Xylene	1.5 and included in TTO limit	Delete local limit of 1.5 mg/L

Table 8-2 summarizes the rationale given for not assessing several POCs for further local limits evaluation.

TABLE 8-2
Review of Potential POCs Not Undergoing Local Limits Evaluation

Constituent	Existing Local Limits (mg/l)	Modification
Aldrin	None	None, Contaminant banned from use and discharge prohibited to the sanitary sewer
Ammonia	None	None, Contaminant regulated under narrative discharge prohibition
Benzo (b) Fluoranthene	None	Insufficient monitoring information due to high detection limit to develop meaningful local limits
Biochemical Oxygen Demand	None	None, Contaminant regulated under narrative discharge prohibition
Chlorine Residual	None	None, Contaminant indirectly regulated under narrative discharge prohibition
Dieldrin	None	None, Contaminant banned from use and discharge prohibited to the sanitary sewer
Endosulfan Beta	None	None, Not manufactured in US and highly restricted to agricultural use only
Heptachlor	Included in TTO Limit	None, Contaminant banned from use and discharge prohibited to the sanitary sewer
Heptachlor Expoxide	Included in TTO Limit	None, Contaminant banned from use and discharge prohibited to the sanitary sewer
Indeno (1,2,3-cd) Pyrene	None	Insufficient monitoring information due to high detection limit to develop meaningful local limits
Oil & Grease	None	None, Contaminant indirectly regulated under narrative discharge prohibition
Settleable Matter	None	None, Contaminant regulated under narrative discharge prohibition
2,3,7,8-TCDD	Included in TTO Limit	Insufficient monitoring information due to high detection limit to develop meaningful local limits
Total Suspended Solids	None	None, Contaminant regulated under narrative discharge prohibition
Tributyltin	None	None, Contaminant banned from use and discharge prohibited to the sanitary sewer
TTO	2.13	No modification at this time
Turbidity	None	None, Contaminant regulated under narrative discharge prohibition

9.0 Public Participation Process for Local Limits Review and Ordinance Update

Section 101(e) of the CWA establishes public participation as one of the goals in the development, revision, and enforcement of any regulation, standard, effluent limitation, plan, or program established by EPA or any State. The General Pretreatment Regulations encourage public participation by requiring public notices or hearings for program approval, removal credits, program modifications, local limits development and modifications, and IUs in significant non-compliance.

POTW pretreatment program approval requests require the Approval Authority (State or EPA) to publish a notice (including a notice for a public hearing) in a newspaper of general circulation within the jurisdiction served by the POTW. All comments regarding the request as well as any request for a public hearing must be filed with the Approval Authority within the specified comment period, which generally lasts 30 days. The Approval Authority is required to account for all comments received when deciding to approve or deny the submission. The decision is then provided to the POTW and other interested parties, and published in the newspaper. All comments received are made available to the public for inspection and copying.

Once a local pretreatment program is approved, the POTW must implement that program as approved. Before there is a significant change in the operation of a POTW pretreatment program, a program modification must be initiated. For a substantial program modification, such as the development of new or less stringent local limits, the POTW is required to notify the Approval Authority of the desire to modify its program and the basis for the change. Approval Authorities (or POTWs) also are required to issue public notice of the request for a modification, but are not required to issue public notice of the decision if no comments are received and the request is approved without changes. These changes become effective upon approval by the Approval Authority.

Federal regulations also require POTWs to notify affected persons and groups and give them an opportunity to respond before final promulgation of a local limit [40 CFR 403.5(c)(3)]. While the regulations do not specify the exact public notice process that a POTW should follow, EPA recommends that the POTW conduct public participation in the local limits process as openly as possible. This process would include notifying affected users and other parties that the POTW knows are interested that the POTW is beginning a detailed reevaluation of its local limits. When new limits are drafted, EPA recommends notifying the IUs and other interested parties, individually, of the proposed limits and announce a public comment period in the local newspaper.

9.1   San Jose's Public Participation Process

An external stakeholders' focus group was formed with representatives invited from individual industrial dischargers, various industrial associations, tributary agencies, non-governmental organizations, the Water Board, and the USEPA. A more comprehensive stakeholder mailing list has been compiled including all industrial users, along with the tributary area, non-governmental organizations, and regulatory representatives.

The following opportunities for input are planned:

- **Local Limits Process Description** - On June 2005 a meeting was convened to present the local limits review process to the external stakeholders' focus group. Presentations regarding the rationale for the review, the information that had been gathered to date, and the future schedule were provided. There were opportunities for questions and discussion.

- **Draft Local Limits Evaluation Report -** The draft *2006 Local Limits Re-evaluation and Sewer Use Ordinance Review Summary Report* will be presented to the external stakeholders' focus group for discussion and comment.

- **Final Local Limits Evaluation Report -** After approval by the Water Board and USEPA, the final report with proposed changes to the local limits and sewer use ordinance will be submitted to the City Council and then the tributary agencies for final adoption.

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Appendices

APPENDIX A

Table A-1
Permitted Industrial Users and Categorical Zero Discharge Facilities

Organization Name	Permit #	Categorical Industrial User	Significant Industrial User	Categorical Zero Discharge
A & E Anodizing	SJ-314B	Yes	Yes	No
A & F Auto Detail	SJ-507B	No	No	No
A Tool Shed	WV-033B	No	No	No
A. J. Services	SJ-043C	No	Yes	No
A.J. Auto Detailing	SJ-176B	No	No	No
A-1 Plating, Inc.	SC-041A	Yes	Yes	No
A-1 Plating, Inc. (Walsh)	SC-329B	Yes	Yes	No
Abbott Laboratories, Diagnostics Division	SC-194B	No	No	No
Accu-Burr Metal Finishing	NA ZDC	Yes	Yes	Yes
Adaptive Circuits	SJ-020A	Yes	Yes	No
Advanced Component Labs	SC-360B	Yes	Yes	No
Advanced Metal Finishers LLC	SJ-516B	Yes	Yes	No
Advanced Power Technology-RF, Inc.	SC-346B	Yes	Yes	No
Advanced Printed Circuit Technology	SC-065A	Yes	Yes	No
Advanced Surface Finishing Inc.	SJ-514B	Yes	Yes	No
Agilent Technologies, Inc. (Stevens Creek)	SC-321B	Yes	Yes	No
Agilent Technologies, Inc. (Trimble Road)	SJ-451A	Yes	Yes	No
Ahead Magnetics dba AheadTek	SJ-500B	No	No	No
Air Flight Services	SC-159B	No	No	No
Airtronics Metal Products	SJ-319B	Yes	Yes	No
AKT America, Inc. (Applied Komatsu Tech)	SC-258A	No	No	No
Allergan, Inc.	WV-044B	Yes	Yes	No
Altaflex, Inc.	SC-316B	Yes	Yes	No
Alzeta Corporation	SC-151B	No	No	No
Amalar, Inc.	SC-134B	No	No	No
Ambitech Int'l, Inc.- Hunter Tech. Div.	SC-338B	Yes	Yes	No
Amex Plating, Inc.	SC-182B	Yes	Yes	No
Amtech Microelectronics	SJ-434B	No	No	No
AnaSpec, Inc.	SJ-367B	No	No	No
Appian Engineering, Inc	MI-107B	No	No	No
Applied Anodize, Inc.	SJ-025B	Yes	Yes	No
Applied Materials, Bldgs. 2 & 3	SC-092A	Yes	Yes	No
Arrowhead Mountain Spring Water	MI-114B	No	No	No
ATMI	SJ-466B	No	No	No
Babbitt Bearing	NA ZDC	Yes	Yes	Yes
Beam On Technolgy	SC-355B	No	No	No
Becton Dickinson Immunocytometry Sys.	SJ-128B	No	No	No
Beta Circuits	SC-318B	Yes	Yes	No
Bi-CMOS Foundry	SC-349B	Yes	Yes	No
BOC Edwards	SC-326B	No	No	No
BridgeWave Communications	NA ZDC	Yes	Yes	Yes
Burke Industries, Inc. (Tenth)	SJ-201B	Yes	Yes	No
California Army National Guard, OMS #38	SJ-498B	No	No	No
California Auto Tinting and Polishing	NA ZDC	Yes	Yes	Yes
California Eastern Labs	SC-109B	Yes	Yes	No

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Table A-1 Permitted Industrial Users and Categorical Zero Discharge Facilities				
Organization Name	**Permit #**	**Categorical Industrial User**	**Significant Industrial User**	**Categorical Zero Discharge**
California Paperboard Corp.	SC-005C	Yes	Yes	No
Calpine Corp. dba Los Esteros Critical E	SJ-488A	No	Yes	No
Calypso Imaging Inc.	SC-061B	No	No	No
Capitol Premier Carwash	SJ-472B	No	No	No
CBR Circuits	MI-013B	Yes	Yes	No
Celeritek, Inc.	SC-205B	Yes	Yes	No
Cirexx Corp.	SC-034A	Yes	Yes	No
City of Santa Clara	SC-235A	No	No	No
Santa Clara, dba Silcon Valley Power, Pico Power F	SC-354B	Yes	Yes	No
Clean Harbors San Jose LLC	SJ-487A	Yes	Yes	No
Coast Counties Truck & Equipment Co.	SJ-484B	No	No	No
Coast Engraving	NA ZDC	Yes	Yes	Yes
Coatek	SC-026B	No	No	No
Coherent, Inc.	SC-173B	Yes	Yes	No
Component Finishing, Inc.	SC-002B	Yes	Yes	No
Compugraphics USA	WV-052B	Yes	Yes	No
Conagra Snack Foods Group	SJ-023C	No	Yes	No
Concrete Structures	SJ-298B	No	No	No
Contract Transportation Services	SJ-236B	No	No	No
Cordova Printed Circuits	MI-017B	Yes	Yes	No
Crain Cutter Co. Inc.	MI-070C	Yes	Yes	No
Crown Disc	MI-115B	Yes	Yes	No
Crystallume Corporation	SC-312B	No	No	No
CS Plating	SJ-071B	Yes	Yes	No
CSL, Inc./AA Metal Processing	SC-133B	Yes	Yes	No
Cypress Semiconductor (3901 N. 1st)	SJ-024A	Yes	Yes	No
Cypress Semiconductor Corp.(3939 N. 1st)	SJ-460B	Yes	Yes	No
Data Circuit Systems Inc dba Merix San Jose	SJ-518B	Yes	Yes	No
DEK USA Logistics	SJ-496B	No	No	No
Diana Fruit Company	SC-002C	Yes	Yes	No
Disco Hi-Tec America, Inc.	SC-331B	No	No	No
Du All Anodizing Company	SJ-010B	Yes	Yes	No
Dupont Photomasks	SC-050B	Yes	Yes	No
Dynamic Details, Inc	MI-014A	Yes	Yes	No
Eagle Tech, Inc	SJ-520B	Yes	Yes	No
Ecolab, Inc.	SJ-304B	No	Yes	No
ECS Refining	SC-144B	Yes	Yes	No
E-Fab, Inc.	SC-096B	Yes	Yes	No
Elcon, Inc.	SJ-063B	Yes	Yes	No
Electropolishing Shop	SC-193B	No	No	No
Elmwood Correctional Facility	MI-089B	No	No	No
ENS Technology	SC-252A	Yes	Yes	No
EPZ, Inc.	SC-328B	Yes	Yes	No
Etched Media	WV-009B	Yes	Yes	No
Evenstar	SC-034B	Yes	Yes	No
Excelics Semiconductor, Inc.	SC-256B	Yes	Yes	No

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Table A-1 Permitted Industrial Users and Categorical Zero Discharge Facilities				
Organization Name	**Permit #**	**Categorical Industrial User**	**Significant Industrial User**	**Categorical Zero Discharge**
Exchange Linen Service	SJ-022C	No	Yes	No
Exper-Cast Foundry	NA ZDC	Yes	Yes	Yes
Express Tech, Inc.	NA ZDC	Yes	Yes	Yes
Fairchild Imaging, Inc.	MI-100B	Yes	Yes	No
Fed Ex Freight System, Inc.	MI-036B	No	No	No
Fed Ex Freight Systems, Inc.	SC-157B	No	No	No
Finishing First, Inc.	SC-010B	Yes	Yes	No
FJM Truck Repair, Inc.	SJ-400B	No	No	No
Flex Interconnect Tech	MI-116B	Yes	Yes	No
Foothill/De Anza Community College Distr	CU-033B	No	No	No
G & K Services	SJ-313C	No	Yes	No
Glide/Write, Division of Marburg Tech	MI-073B	No	No	No
Golden Bear Packaging, Inc.	SJ-050B	No	No	No
Good Samaritan Hospital	SJ-442B	No	No	No
Gordon Biersch Brewing Company, Inc.	SJ-352C	No	No	No
Granite Construction Company	SC-363B	No	No	No
GreenWaste Recovery, Inc.	SJ-375B	No	No	No
Guadalupe Rubbish Disposal Company, Inc.	SJ-300B	No	No	No
Harbor Electronics, Inc.	SC-301B	Yes	Yes	No
Haro's Anodizing Specialists	SC-222B	Yes	Yes	No
Haro's Metal Finishing	NA ZDC	Yes	Yes	Yes
Headway Technologies, Inc.	MI-057A	Yes	Yes	No
HED Battery Corp.	NA ZDC	Yes	Yes	Yes
Hill Bros. Chemical Co.	SJ-059B	No	No	No
Hitachi Global Technologies, Inc	SJ-495A	Yes	Yes	No
Hi-Temp Technologies, Inc.	SJ-122B	Yes	Yes	No
Honeywell International	SC-225B	No	No	No
Hosmer-Dorrance	WV-038B	No	No	No
Husko, Inc.- dba SAE Magnetics	MI-092B	No	No	No
IBM Almaden Center	SJ-284B	Yes	Yes	No
INTA Technologies	SC-307B	Yes	Yes	No
Integrated Device Technology, Inc	SJ-519B	No	No	No
Intel Corporation	SC-028A	Yes	Yes	No
Intel Corporation, SC-1	SC-030A	Yes	Yes	No
Intel Corporation, SC-2	SC-277A	Yes	Yes	No
Intel Corporation, SC-3	SC-014B	No	No	No
Intel, Corp. D2P3	SC-249A	Yes	Yes	No
International Disposal Corporation, Inc	SJ-437A	No	Yes	No
Intevac	SC-259B	Yes	Yes	No
Intricast CO., Inc.	NA ZDC	Yes	Yes	Yes
Ionics UltraPure Water Corporation	SJ-393A	No	Yes	No
Italix, Inc.	SC-028B	Yes	Yes	No
ITW Texwipe PMG	SJ-485B	No	No	No
J & B Enterprises	SC-327B	No	No	No
J. Lohr Winery	SJ-024C	No	No	No
Jabil Circuit, Inc	SJ-447B	No	No	No

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Table A-1 Permitted Industrial Users and Categorical Zero Discharge Facilities				
Organization Name	**Permit #**	**Categorical Industrial User**	**Significant Industrial User**	**Categorical Zero Discharge**
JD International	SJ-999A	Yes	Yes	No
JDS Uniphase (Los Coches)	MI-109B	No	No	No
JDS Uniphase (Rose)	SJ-493B	Yes	Yes	No
Jefferson Smurfit (Container Corp.)	SC-003C	Yes	Yes	No
Jefferson Smurfit Corp.	MI-037B	No	No	No
Jennings Technology Corporation	SJ-216B	Yes	Yes	No
Johnson Matthey, Inc	SJ-499B	Yes	Yes	No
K & S Metal Finishing Co.	SC-298B	Yes	Yes	No
K & S Semitec Corporation	SC-288B	Yes	Yes	No
KAF International	SJ-400A	Yes	Yes	No
Kearney Pattern Works	NA ZDC	Yes	Yes	Yes
Kelloggs Company	SJ-021C	No	No	No
Kelytech Corp.	MI-117B	No	No	No
Kion Technology, Inc.	SJ-191B	Yes	Yes	No
KMIC Technology, Inc (formerly CPI)	SJ-504B	Yes	Yes	No
Komag, Inc. Bldg. 10	SJ-341A	No	Yes	No
Kulicke & Soffa Industries, Inc	SJ-467B	Yes	Yes	No
Kurtt International Trucks	SJ-491B	No	No	No
Lenthor Engineering	MI-018B	Yes	Yes	No
Lenthor Engineering, LLC	MI-112B	Yes	Yes	No
Lightwaves 2020	MI-104B	Yes	Yes	No
Linear Technology	MI-006A	No	Yes	No
Linear Technology Corporation	MI-088B	Yes	Yes	No
Longs Drug Store #075	SC-185B	No	No	No
Longs Drug Store #082	WV-049C	No	No	No
Longs Drug Store #085	SJ-368B	No	No	No
Longs Drug Store #091	SJ-223B	No	No	No
Longs Drug Store #114	CU-040B	No	No	No
Longs Drug Store #115	CU-042B	No	No	No
Longs Drug Store #161	MI-071B	No	No	No
Longs Drug Store #229	SJ-377B	No	No	No
Longs Drug Store #257	SJ-412B	No	No	No
Longs Drug Store #260	CU-039B	No	No	No
Longs Drug Store #262	SC-303B	No	No	No
Longs Drug Store #263	WV-023B	No	No	No
Longs Drug Store #264	SJ-423B	No	No	No
Longs Drug Store #272	SJ-378B	No	No	No
Longs Drug Store #302	SJ-424B	No	No	No
Longs Drug Store #337	SJ-411B	No	No	No
Longs Drug Store #356	SC-337B	No	No	No
Longs Drug Store #395	SJ-490B	No	No	No
Longs Drug Store #427	WV-051B	No	No	No
Longs Drug Store #466	SJ-465	No	No	No
Longs Drug Store #518	SJ-452B	No	No	No
Longs Drug Store #534	SJ-469B	No	No	No
Longs Drug Store #559	SJ-502B	No	No	No

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Table A-1 Permitted Industrial Users and Categorical Zero Discharge Facilities				
Organization Name	**Permit #**	**Categorical Industrial User**	**Significant Industrial User**	**Categorical Zero Discharge**
LSA-CLEANPART, LLC	SJ-318B	Yes	Yes	No
Main Jail Facility - County of Santa Clara	SJ-444B	No	No	No
Maxim Integrated Products, Inc.	SJ-369B	Yes	Yes	No
MedImmune Vaccines, Inc.	SC-340B	No	No	No
Merit Sensor Systems	SC-164B	Yes	Yes	No
Metal Graphics	NA ZDC	Yes	Yes	Yes
Metcalf Energy Center LLC	SJ-515B	Yes	Yes	No
Micrel, Inc.	SJ-258A	Yes	Yes	No
Micro-Chem, Inc.	SC-218B	Yes	Yes	No
Mission Valley Ford Truck Sales, Inc.	SJ-178B	No	No	No
MMC Technology, Inc.(formerly Max Media)	SJ-483A	Yes	Yes	No
Mohawk Packing, Div. of John Morrell	SJ-373C	No	Yes	No
M-Pulse Microwave, Inc.	SJ-035B	Yes	Yes	No
M'S Refinishing	SC-120B	Yes	Yes	No
Nanoink, Inc	WV-058B	Yes	Yes	No
Nanometrics, Inc.	NA ZDC	Yes	Yes	Yes
NanoNexus, Inc	SJ-501B	Yes	Yes	No
National Semiconductor	SC-020A	No	No	No
NeoPhotonics Corporation	SJ-503B	No	No	No
New Age Metal Finishing	NA ZDC	Yes	Yes	Yes
Noranda Recycling, Inc.	NA ZDC	Yes	Yes	Yes
Novellus Systems, Inc. 3011 N. First	SJ-384B	No	No	No
Novellus Systems, Inc. 3950 N. First	SJ-124B	No	Yes	No
Novellus Systems, Inc. 4000 N. First	SJ-383B	Yes	Yes	No
Novellus Systems, Inc. 81 Vista Montana	SJ-190B	No	Yes	No
Nu-Metal Finishing, Inc.	SC-064B	Yes	Yes	No
OLS Energy-Agnews, Inc.	SJ-388B	Yes	Yes	No
OSRAM Opto Semiconductors, Inc.	SJ-446B	Yes	Yes	No
Owens-Corning Fiberglas Corp.	SC-011A	No	No	No
Pac Tech USA Packaging	SC-343B	Yes	Yes	No
Pacific Aerospace Services	WV-001B	Yes	Yes	No
Pacific Motor Trucking	MI-033B	No	No	No
Paramount's Great America	SC-304A	No	No	No
Parlex Corporation - San Jose Division	SJ-459B	Yes	Yes	No
Peninsula Coating Svcs.	SC-210B	Yes	Yes	No
Peninsula Corridor Joint Powers Board	SJ-320B	No	No	No
Peninsula Metal Fabrication	SJ-438B	Yes	Yes	No
Penitencia Water Treatment Plant	SJ-523B	No	No	No
Penske Truck Leasing Co. LP	SC-361B	No	No	No
Penske Truck Leasing Co., L.P.	SJ-486B	No	No	No
PerkinElmer, Inc.-Optoelectronics	SC-264A	Yes	Yes	No
PK Selective Metal Plating, Inc.	SC-013B	Yes	Yes	No
Polishing Corp. of America	SC-012C	No	No	No
Premium Plating	NA ZDC	Yes	Yes	Yes
Process Stainless Lab. (Milpitas)	MI-113B	No	No	No
Process Stainless Lab., Inc.	SC-276B	No	No	No

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Table A-1				
Permitted Industrial Users and Categorical Zero Discharge Facilities				
Organization Name	**Permit #**	**Categorical Industrial User**	**Significant Industrial User**	**Categorical Zero Discharge**
Prodigy Surface Tech, Inc.	SC-344B	Yes	Yes	No
Prudential Overall Supply	MI-040B	No	Yes	No
Pycon, Inc.	SC-061A	Yes	Yes	No
Pyramid Circuits	SC-009B	Yes	Yes	No
Quality Plating, Inc.	SJ-079B	Yes	Yes	No
QualTech Circuits, Inc.	SC-345B	Yes	Yes	No
Quartz International Corp(Saint Golbain)	MI-081C	No	No	No
QuickSil Inc.	SJ-376B	Yes	Yes	No
Reaction Technology	SJ-508B	No	No	No
Reaction Technology	SC-147B	No	Yes	No
Reed & Graham, Inc.	SJ-461B	No	No	No
Ritz Camera Center #269	SC-352B	No	No	No
Ritz Camera Centers #1340	CU-044B	No	No	No
Ritz Camera Centers #1343	WV-057B	No	No	No
Ritz Camera Centers #1345	SJ-477B	No	No	No
Ritz Camera Centers #1346	SJ-478B	No	No	No
Ritz Camera Centers #1348	SJ-480B	No	No	No
Ritz Camera Centers #1349	SJ-481B	No	No	No
Ritz Camera Centers #1350	SJ-482B	No	No	No
Ritz Camera Centers #1351	SJ-476B	No	No	No
Ritz Camera Centers #1352	SJ-475B	No	No	No
Ritz Camera Centers #1353	SC-334B	No	No	No
Ritz Camera Centers, Inc #1696	SC-351B	No	No	No
RMC Pacific Material	SJ-364C	No	No	No
Ryder Truck Rental	SJ-008C	No	No	No
S.J. Valley Plating, Inc.	SC-017B	Yes	Yes	No
SAE Materials	SC-358B	No	No	No
San Jose Auto Steam Cleaning	SJ-055B	No	No	No
San Jose Die Casting Corp.	NA ZDC	Yes	Yes	Yes
San Jose Mercury News	SJ-017B	No	No	No
San Jose Municipal Water System	SJ-463B	No	No	No
San Jose State University Cogen Plant	SJ-448B	Yes	Yes	No
San Jose Tallow Company	SJ-511B	No	No	No
San Jose Water Co WV-902B saratoga filt	WV-902B	No	Yes	No
San Jose Water Company CU-901C	CU-901C	No	No	No
San Jose Water Company SJ-901C	SJ-901C	No	No	No
San Jose Water Company WV-901C	WV-901C	No	No	No
Sanmina Corp Plant I	SJ-022A	Yes	Yes	No
Sanmina Corp Plant II	SJ-043A	Yes	Yes	No
Santa Clara County Roads & Airports, EY	SJ-329B	No	No	No
Santa Clara County Roads & Airports, WY	SJ-353B	No	No	No
Santa Clara County Trans. Agency 7th	SJ-138B	No	No	No
Santa Clara County Trans. Agency Zanker	SJ-139B	No	No	No
Santa Clara Plating Co.	SC-029B	Yes	Yes	No
Santa Clara Valley Health and Hospital S	WV-055B	No	No	No
Seagate Technology, Incorporated	MI-105A	No	Yes	No

APPENDIX A

Table A-1 Permitted Industrial Users and Categorical Zero Discharge Facilities				
Organization Name	**Permit #**	**Categorical Industrial User**	**Significant Industrial User**	**Categorical Zero Discharge**
Serra Micro Chassis	SJ-034A	Yes	Yes	No
SFPP, L.P.	SJ-379B	No	No	No
Silicon Genesis Corporation SJ	SJ-427B	No	No	No
Silicon Microstructures	MI-108B	Yes	Yes	No
Silicon Quest International	SC-269B	No	No	No
Silicon Valley Container	SC-234B	No	No	No
Silicon Valley Electroplating Corp.	MI-055B	Yes	Yes	No
SIMS Group USA Corporation	SJ-220B	No	No	No
Sipex Corporation MI	MI-075B	Yes	Yes	No
SJJC FBO Services, LLC	SJ-429B	No	No	No
Smurfit-Stone Container Corp.	SC-208B	No	No	No
Smythe European	SJ-170B	No	No	No
Solectron Corporation Bldg 1	MI-082B	No	No	No
Solectron Corporation Bldg 2	MI-083B	No	No	No
Solectron Corporation Bldg 6	MI-085B	No	No	No
Son Manufacturing	SJ-100B	Yes	Yes	No
Specialty Truck Parts Inc.	SJ-339C	No	No	No
Spectra, Inc.	SC-342B	No	No	No
Stephens Meat Company	SJ-005C	No	Yes	No
Stericycle, Incorporated	MI-103B	No	No	No
Steve Sanford, Inc.	WV-011B	No	No	No
Streamline Circuits	SC-350A	Yes	Yes	No
Sun Surface Technology	SJ-510B	Yes	Yes	No
Superior Chrome	SJ-263B	Yes	Yes	No
Superior Metal Finishers	SJ-517B	Yes	Yes	No
Superior Metal Finishers	SJ-020B	Yes	Yes	No
Supertex, Inc.	SJ-398B	Yes	Yes	No
Swift Metal Finishing	SC-035B	Yes	Yes	No
Symprotek Corporation	MI-098B	No	No	No
Symyx Technology(3040)	SC-315B	No	No	No
Symyx Technology(3100)	SC-275B	No	No	No
Syva Company	CU-041B	No	No	No
T. Marzetti Co.- West	MI-004C	No	Yes	No
TecHarmonic	SJ-454B	No	No	No
Teikoku Pharma USA	SJ-513B	Yes	Yes	No
Telewave, Inc	SJ-471B	Yes	Yes	No
Teltec Corporation DBA: Gorilla Circuits	SJ-449B	Yes	Yes	No
Tessera, Inc.	SJ-315B	No	No	No
THAT Intergrated Systems Corporation	MI-078B	Yes	Yes	No
The Picture People (Valley Fair)	SC-353B	No	No	No
The Picture People Oakridge	SJ-509B	No	No	No
Town of Los Gatos, SCC	WV-021B	No	No	No
Triad Tool And Engineering, Inc.	SJ-273B	Yes	Yes	No
TwinSoft (formerly Twin Solutions, LLC)	SC-306B	Yes	Yes	No
Tyco Electronics, M/A-COM	SJ-494B	Yes	Yes	No
Tyco Printed Circuit Group/ Santa Clara	SC-285A	Yes	Yes	No

APPENDIX A

Table A-1				
Permitted Industrial Users and Categorical Zero Discharge Facilities				
Organization Name	**Permit #**	**Categorical Industrial User**	**Significant Industrial User**	**Categorical Zero Discharge**
U S Postal Service, VMF	SJ-226B	No	No	No
U.S. Filter/Ionpure, Inc.	MI-065C	No	Yes	No
Ultratech Stepper-Zanker	SJ-292B	No	No	No
Ultratech, Inc--Junction	SJ-445B	No	No	No
Uni-Flex Circuits, Inc.,	SJ-399B	Yes	Yes	No
United Defense LP Ground Systems Division	SC-348B	No	No	No
United Parcel Service	SJ-474B	No	No	No
United Plating	SJ-347B	Yes	Yes	No
Universal Semiconductor	SJ-150B	Yes	Yes	No
University Plating	SJ-028B	Yes	Yes	No
Valley Radiologists Medical Group, Inc.	SJ-253B	No	No	No
Variety Metal Finishing	SJ-111B	Yes	Yes	No
Vector Fabrication	MI-059B	Yes	Yes	No
Vishay/Siliconix	SC-282A	Yes	Yes	No
VISSSIX Corporation	SC-284B	Yes	Yes	No
VLSI Standards, Inc.,	SJ-305B	Yes	Yes	No
Volpar, Inc.	SC-156B	No	No	No
Wafer Reclaim Service, Inc.	SJ-294B	No	Yes	No
Walgreens #2081	SJ-526B	No	No	No
Wal-Mart Store #5435	SJ-512B	No	No	No
Winslow Automation, Inc. dba: Six Sigma	MI-106B	No	No	No
WIT Sales & Ref.	NA ZDC	Yes	Yes	Yes
WJ Communications	MI-090B	Yes	Yes	No
Xenoport	SC-339B	No	No	No
Zanker Road Resource Management, Ltd.	SJ-381B	No	No	No

APPENDIX B

ROS and MR Method for Calculating Values for Non-Detects

Both the original ROS and the MR methods are based on ordered statistics of observed data and the assumption that data come from a normal or log-normal distribution.

If Y is from a normal distribution with mean μ and standard deviation σ (Y ~ N(:,σ)) and Z is from a normal distribution with mean 0 and standard deviation 1 (Z ~ N(0, 1)), statistical theories show that Y =μ:+ σZ when Y and Z are at the same percentiles in their respective distributions. For a given observation (sampling result) Y that is above the detection limit, we can calculate the "order statistic", i.e., the proportion of observations that are less than Y. This order statistic of Y is an estimate of the percentile. The corresponding Z value is available by either using existing computer program or checking the normal distribution table. In other words, we have a list of observations that are above the detection limit (Y_1, Y_2, ..., Y_m) and a list of Z values (Z_1, Z_2, ..., Z_m) that are of the same percentiles as the respective Y values. By performing a regression analysis of Y against Z, the resulting intercept and slope are estimates of the mean and standard deviation of the distribution of Y.

When the data are from a log-normal[1] distribution, a log transformation is needed before the regression. The estimated mean and standard deviation is for the log-transformed variable. To convert the estimates to the original metric, the standard log-normal distribution results should be used. For example, if Y is from a log-normal distribution, and estimated mean and variance for log(Y) are μ:and σ, the mean of Y is the variance of Y is

$$e^{2\mu+\sigma^2} \times \left(e^{\sigma^2} - 1 \right)$$

Alternatively, one may use the regression equation to "fill in" the missing (BDL) values. This is possible because one can calculate the order statistics for all BDL values. For example, suppose we have 20 out of 100 observations are BDL. The order statistics for the 20 BDL values are 0.01, 0.02, ..., 0.20. Using these order statistics, one can get the corresponding Z values Z_1, Z_2, ..., Z_{20}. Substituting these Z values into the regression model, we have the 20 fill-in Y values.

To recap, we first define the variables used in this method:

n = Total number of observations
k = Number of BDL observations
Y_i= Value of the ith ranked observation

To utilize the ROS method, data are first ranked from smallest to largest so that Y_n is the largest data value and Y_1 through Y_k are the unknown BDL values. If an approximately normal distribution is expected, each Y_i is plotted on the y-axis against the expected normal order statistic Z_i for each rank i. The following linear regression is used to obtain μ and σ, using only the points above the DL (i.e., i = k+1,...,n).

$Y_i = \mu + \sigma Z_i$

One may use the estimated intercept and slope as the mean and standard deviation. Alternatively, one may use the above equation to obtain appropriate "fill-in" values for each of the k BDLs using the Z-statistic. The mean and standard deviation are then calculated using traditional formulas applied to both the observed and filled-in data. Thus, the estimated data are based on the assumption of normality, while the observed data

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1 Log-normal distributions are probability distributions which are closely related to normal distributions: if X is a normally distributed random variable, then exp(X) has a log-normal distribution. In other words: the natural logarithm of a log-normally distributed variable is normally distributed.

are used directly with no assumption about their distribution. This method is relatively robust to departures from normality or lognormality (Gilliom and Helsel 1986).

If a distribution is expected to be skewed, then $\log(Y_i)$ is plotted against Z_i and the fitted data and the observed data are transformed back to original units from which the mean and standard deviation are calculated (Gilliom and Helsel 1986). Transformation of the data, rather than the summary statistics, avoids inherent transformation bias (Helsel 1990).

MR METHOD
The MR method, an extension of the ROS method, accounts for multiple detection limits. When there is only one detection limit, the k-BDL values are assigned order statistics of 1 through k. When there are multiple detection limits, it is not obvious how to assign the order statistic for some of the data, both below or above some detection limits.

For example, suppose we have the following five observations: <100, 110, <200, 250, and 300. It is obvious that the two largest observations, 250 and 300 should receive order statistics of 4 and 5. But the rest is not clear, because the value labeled as <200 can be 199 or 9. Helsel and Cohn (1988) developed a plotting position method for assigning order statistics when there are multiple detection limits. The idea is that although we don't know exactly where the value, say <200, should fall, we can lay out all possible positions for this particular value and take the average rank of all possible ranks.

For example, the value labeled as <200 can be the smallest (rank 1), the second smallest (rank 2), or the third smallest (rank 3), the average rank is (1+2+3)/3 = 2. The value 110 can be the second smallest or the third smallest, therefore a rank of (2+3)/2 = 2.5. Finally, the observation <100 receives a rank of (1+2)/2=1.5. Once the order statistics are assigned, one may use the same regression analysis method in the ROS method. When there is only one detection limit, the MR method is the same as the ROS method.

Helsel and Cohn (1988) found that if a single estimating method for several descriptive statistics is desired and the sampling distribution of a data set is unknown, the MR method should be utilized. The actual plotting procedure for the MR method is detailed in Appendix B of Estimation of Descriptive Statistics for Multiple Censored Water Quality Data (Helsel and Cohn, 1988). [2]

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[2] 2004 Local Limits Development Guidance Appendices, USEPA Office of Water Management, EPA-833-R-04-002A, July 2004 pg. Q1-Q2

Table C-1 provides the results of an updated Reasonable Potential Analysis using data from 2002-2004

Table Appendix C-1
Reasonable Potential Analysis Update

Constituent	Type	2003 NPDES Permit RPA	Enclosure A Reporting Limit	Max Effluent 2002-2004** (ppb)	Minimum CTR Criteria (ppb)	Reporting Limit greater than CTR?	Minimum Criteria	Greater than Minimum Criteria?
Antimony	Metal	No	0.5	1.6	4300	No	4300	No
Arsenic	Metal	No	0.5	1.6	36	No	36	No
Beryllium	Metal	No	0.5	0.29	NA	NA	NA	NA
Cadmium	Metal	No	0.5	0.23*	7.30	No	7.3	No
Chromium	Metal	No	0.5	1.7	200	No	200	No
Copper	Metal	Yes	0.5	6.0	13.02	No	13.02	No
Cyanide	Metal	No	5	8	1	Yes	5	Yes
Lead	Metal	No	0.5	2.5	162	No	162	No
Manganese	Metal	No	NA	9	NA	NA	NA	NA
Mercury	Metal	Yes	0.5	0.003*	0.051	No	0.051	No
Molybdenum	Metal	No	NA	12	NA	NA	NA	NA
Nickel	Metal	Yes	5	11	27.05	No	27.05	No
Selenium	Metal	No	5	0.811	5	No	5	No
Silver	Metal	No	0.2	0.24	2.24	No	2.24	No
Thallium	Metal	No	2	1.00	6.3	No	6.3	No
Zinc	Metal	No	1	120	170	No	170	No
Acenaphthene	Semi-Volatile	No	2.0	0.044	2700	No	2700	No
Acenaphthylene	Semi-Volatile	No	2.0	ND	NA	NA	NA	NA
Acrolein	Volatiles	No	2.0	ND	780	No	780	No
Acrylonitrile	Volatiles	No	2.0	ND	0.66	No	0.66	No
Aldrin	PCB Pesticides	No	0.005	0.0032*	0.00014	Yes	0.005	No
Anthracene	Semi-Volatile	No	2.0	ND	110000	No	110000	No
Benzene	Volatiles	No	0.5	ND	71	No	71	ND
Benzidine	Semi-Volatile	No	5.0	ND	0.00054	Yes	5	ND
Benzo(a) Anthracene	Semi-Volatile	No	5.0	ND	0.049	Yes	5	ND
Benzo(a)Pyrene	Semi-Volatile	No	2.0	ND	0.049	Yes	2	ND
Benzo(b) Fluoranthene	Semi-Volatile	Yes	10	0.055 *	0.049	Yes	10	No
Benzo(ghi) Perylene	Semi-Volatile	No	0.1	ND	NA	NA	NA	NA
Benzo(k) Fluoranthene	Semi-Volatile	No	2	ND	0.049	Yes	2	ND
Bis (2-Chloroethoxy) Methane	Semi-Volatile	No	5	ND	NA	NA	NA	NA
Bis(2-Chloroethyl) Ether	Semi-Volatile	No	2	ND	1.4	Yes	2	No
Bis(2-Chloroisopropyl) Ether	Semi-Volatile	No	2	0.05*	170000	No	170000	No
Bis(2-Ethylhexyl) Phthalate	Semi-Volatile	No	5	2 *	5.9	No	5.9	No
Bromodichloromethane (Dichlorobromomethane)	Volatiles	No	0.5	5.9	46	No	46	No
Bromoform	Volatiles	No	0.5	0.2 *	360	No	360	No
Bromomethane (Methyl Bromide)	Volatiles	No	1.0	ND	4000	No	4000	No
4-Bromophenyl Phenyl Ether	Semi-Volatile	No	5.0	ND	NA	NA	NA	NA
Butylbenzyl Phthalate	Semi-Volatile	No	10	ND	5200	No	5200	No

Table C-1 provides the results of an updated Reasonable Potential Analysis using data from 2002-2004

Table Appendix C-1
Reasonable Potential Analysis Update

Constituent	Type	2003 NPDES Permit RPA	Enclosure A Reporting Limit	Max Effluent 2002-2004** (ppb)	Minimum CTR Criteria (ppb)	Reporting Limit greater than CTR?	Minimum Criteria	Greater than Minimum Criteria?
Carbon Tetrachloride	Volatiles	No	0.5	ND	4.4	No	4.4	No
Chlordane	PCB Pesticides	No	0.1	ND	0.00059	Yes	0.1	ND
Chlorobenzene (Monochlorobenzene)	Volatiles	No	0.5	ND	21000	No	21000	No
Chloroethane	Volatiles	No	0.5	ND	NA	NA	NA	NA
2-Chloroethylvinyl Ether	Volatiles	No	1	ND	NA	NA	NA	NA
Chloroform	Volatiles	No	0.5	10	NA	NA	NA	NA
Chloromethane (Methyl Chloride)	Volatiles	No	0.5	0.7 *	NA	NA	NA	NA
2-Chloronaphthalene	Semi-Volatile	No	10	ND	4300	No	4300	No
2-Chlorophenol	Semi-Volatile	No	2	ND	400	No	400	No
4-Chlorophenyl Phenyl Ether	Semi-Volatile	No	5	ND	NA	NA	NA	NA
Chloropyrifos	Organophosphates	No	0.0056	ND	NA	NA	NA	NA
Chrysene	Semi-Volatile	No	5	ND	0.049	Yes	5	ND
Dibenzo(a,h) Anthracene	Semi-Volatile	No	0.5	ND	0.049	Yes	0.5	ND
Dibromochloromethane (Chlorodibromomethane)	Volatiles	No	0.5	3.5	34	No	34	No
4,4'-DDD	PCB Pesticides	No	0.05	ND	0.00084	Yes	0.05	ND
4,4'-DDE	PCB Pesticides	Yes	0.05	ND	0.00059	Yes	0.05	ND
4,4'-DDT	PCB Pesticides	No	0.01	ND	0.00059	Yes	0.01	ND
Diazinon	Organophosphates	No	0.05	ND	NA	NA	NA	NA
1,2-Dichlorobenzene	Volatiles	No	0.5	ND	17000	No	17000	No
1,3-Dichlorobenzene	Volatiles	No	0.5	ND	2600	No	2600	No
1,4-Dichlorobenzene	Volatiles	No	0.5	0.6	2600	No	2600	No
3,3-Dichlorobenzidine	Semi-Volatile	No	5	ND	0.077	Yes	5	ND
1,1-Dichloroethane	Volatiles	No	0.5	ND	NA	NA	NA	NA
1,2-Dichloroethane	Volatiles	No	0.5	ND	99	No	99	No
1,1-Dichloroethylene	Volatiles	No	0.5	ND	3.2	No	3.2	No
1,2-Trans-Dichloroethylene	Volatiles	No	0.5	ND	140000	No	140000	No
2,4-Dichlorophenol	Semi-Volatile	No	5	0.056*	790	No	790	No
1,2-Dichloropropane (Propylene Dichloride)	Volatiles	No	0.5	ND	39	No	39	No
Cis-1,3-dichloropropene	Volatiles	No	0.5	ND	NA	NA	NA	NA
Trans 1,3-Dichloroproplyene	Volatiles	No	0.5	ND	1700	No	1700	No
Dieldrin	PCB Pesticides	Yes	0.01	ND	0.00014	No	0.00014	No
Diethyl Phthalate	Semi-Volatile	No	2	0.5	120000	No	120000	No
Dimethyl Phthalate	Semi-Volatile	No	2	ND	2900000	No	2900000	No
2,4-Dimethylphenol	Semi-Volatile	No	1	ND	2300	No	2300	No
Di-n-Butyl Phthalate	Semi-Volatile	No	10	0.74	12000	No	12000	No
2,4-Dinitrophenol	Semi-Volatile	No	5	ND	14000	No	14000	No
2,4-Dinitrotoluene	Semi-Volatile	No	5	ND	9.10	No	9.1	No

APPENDIX C1

Table C-1 provides the results of an updated Reasonable Potential Analysis using data from 2002-2004

Table Appendix C-1
Reasonable Potential Analysis Update

Constituent	Type	2003 NPDES Permit RPA	Enclosure A Reporting Limit	Max Effluent 2002-2004** (ppb)	Minimum CTR Criteria (ppb)	Reporting Limit greater than CTR?	Minimum Criteria	Greater than Minimum Criteria?
2,6-Dinitrotoluene	Semi-Volatile	No	5	ND	NA	NA	NA	NA
Di-n-Octyl Phthalate	Semi-Volatile	No	10	ND	NA	NA	NA	NA
1,2-Diphenylhydrazine	Semi-Volatile	No	1	ND	0.54	Yes	1	ND
Endosulfan (alpha)	PCB Pesticides	No	0.02	ND	0.0087	Yes	0.02	ND
Endosulfan (beta)	PCB Pesticides	No	0.01	ND	0.0087	Yes	0.01	ND
Endosulfan Sulfate	PCB Pesticides	No	0.05	ND	240	No	240	No
Endrin	PCB Pesticides	No	0.01	ND	0.0023	Yes	0.01	ND
Endrin Aldehyde	PCB Pesticides	No	0.01	ND	0.81	No	0.81	No
Ethylbenzene	Volatiles	No	0.5	ND	29000	No	29000	No
Fluoranthene	Semi-Volatile	No	0.05	0.10	370	No	370	No
Fluorene	Semi-Volatile	No	0.1	0.0046 *	14000	No	14000	No
1,2,3,4,6,7,8-hepta CDD	Dioxins	No	NA	0.0062	NA	NA	NA	NA
1,2,3,4,6,7,8-hepta CDF	Dioxins	No	NA	ND	NA	NA	NA	NA
1,2,3,4,7,8,9-hepta CDF	Dioxins	No	NA	ND	NA	NA	NA	NA
Heptachlor	PCB Pesticides	No	0.01	ND	0.00021	Yes	0.01	ND
Heptachlor Epoxide	PCB Pesticides	Yes	0.01	ND	0.0001	Yes	0.01	ND
Alpha-BHC	PCB Pesticides	No	0.01	ND	0.013	No	0.013	No
Beta-BHC	PCB Pesticides	No	0.005	ND	0.046	No	0.046	No
Delta-BHC	PCB Pesticides	No	0.005	ND	NA	NA	NA	NA
Gamma-BHC (Lindane)	PCB Pesticides	No	0.02	ND	0.063	No	0.063	No
1,2,3,4,7,8,-hexa CDD	Dioxins	No	NA	ND	NA	NA	NA	NA
1,2,3,6,7,8-hexa CDD	Dioxins	No	NA	ND	NA	NA	NA	NA
1,2,3,7,8,9-hexa CDD	Dioxins	No	NA	ND	NA	NA	NA	NA
1,2,3,4,7,8-hexa CDF	Dioxins	No	NA	ND	NA	NA	NA	NA
1,2,3,6,7,8-hexa CDF	Dioxins	No	NA	ND	NA	NA	NA	NA
1,2,3,7,8,9-hexa CDF	Dioxins	No	NA	ND	NA	NA	NA	NA
2,3,4,6,7,8-hexa CDF	Dioxins	No	NA	ND	NA	NA	NA	NA
Hexachlorobenzene	Semi-Volatile	No	1	ND	0.00077	Yes	1	ND
Hexachlorobutadiene	Semi-Volatile	No	1	ND	50	No	50	No
Hexachlorocyclopentadiene	Semi-Volatile	No	5	ND	17000	No	17000	No
Hexachloroethane	Semi-Volatile	No	1	ND	8.9	No	8.9	No
Indeno(1,2,3-cd) Pyrene	Semi-Volatile	Yes	0.05	ND	0.049	Yes	0.05	ND
Isophorone	Semi-Volatile	No	1	ND	600	No	600	No
Methylene Chloride (Dichloromethane)	Volatiles	No	0.5	0.8	1600	No	1600	No
4,6-Dinitro, 2 Methylphenol	Semi-Volatile	No	5	ND	765	No	765	No
4-chloro, 3-Methylphenol (3-methyl, 4 chlorphenol)	Semi-Volatile	No	1	0.48	NA	NA	NA	NA
Naphthalene	Semi-Volatile	No	0.2	0.079 *	NA	NA	NA	NA
Nitrobenzene	Semi-Volatile	No	1	ND	1900	No	1900	No

Table C-1 provides the results of an updated Reasonable Potential Analysis using data from 2002-2004

Table Appendix C-1
Reasonable Potential Analysis Update

Constituent	Type	2003 NPDES Permit RPA	Enclosure A Reporting Limit	Max Effluent 2002-2004** (ppb)	Minimum CTR Criteria (ppb)	Reporting Limit greater than CTR?	Minimum Criteria	Greater than Minimum Criteria?
2-Nitrophenol	Semi-Volatile	No	10	ND	NA	NA	NA	NA
4-Nitrophenol	Semi-Volatile	No	5	0.049*	NA	NA	NA	NA
N-Nitrosodimethylamine	Semi-Volatile	No	5	ND	8.1	No	8.1	No
N-Nitrosodi-n-Propylamine	Semi-Volatile	No	5	ND	1.4	Yes	5	No
N-Nitrosodiphenylamine	Semi-Volatile	No	1	ND	16	No	16	No
O-Xylene	Volatiles	No	NA	ND	NA	NA	NA	NA
Octa CDD	Dioxins	No	NA	0.00097	NA	NA	NA	NA
Octa CDF	Dioxins	No	NA	0.000082	NA	NA	NA	NA
Aroclor 1016	PCB Pesticides	No	0.5	ND	0.00017	Yes	0.5	ND
Aroclor 1221	PCB Pesticides	No	0.5	ND	0.00017	Yes	0.5	ND
Aroclor 1232	PCB Pesticides	No	0.5	ND	0.00017	Yes	0.5	ND
Aroclor 1242	PCB Pesticides	No	0.5	ND	0.00017	Yes	0.5	ND
Aroclor 1248	PCB Pesticides	No	0.5	ND	0.00017	Yes	0.5	ND
Aroclor 1254	PCB Pesticides	No	0.5	ND	0.00017	Yes	0.5	ND
Aroclor 1260	PCB Pesticides	No	0.5	ND	0.00017	Yes	0.5	ND
1,2,3,7,8-penta CDD	Dioxins	No	NA	ND	NA	NA	NA	NA
2,3,4,7,8-penta CDF	Dioxins	No	NA	ND	NA	NA	NA	NA
1,2,3,7,8-penta CDF	Dioxins	No	NA	ND	NA	NA	NA	NA
Pentachlorophenol	Semi-Volatile	No	1	ND	8.2	No	8.2	No
Phenanthrene	Semi-Volatile	No	0.05	0.0094 *	NA	NA	NA	NA
Phenol	Semi-Volatile	No	1	ND	4600000	No	4600000	No
Polychlorinated Biphenyls PCBs:	PCB-Total	No	0.5	ND	0.00017	Yes	0.5	ND
Pyrene	Semi-Volatile	No	0.05	ND	11000	No	11000	No
2,3,7,8-tetra CDD (TCDD, Dioxin)	Dioxins	No	NA	ND	1.4E-08	Yes	NA	No
2,3,7,8-tetra CDF	Dioxins	No	NA	0.0034	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	Volatiles	No	0.5	ND	11	No	11	No
Tetrachloroethylene (Tetrachloroethene, Perchloroethylene)	Volatiles	No	0.5	ND	8.85	No	8.85	No
Toluene	Volatiles	No	0.5	0.60 *	200000	No	200000	No
Toxaphene	PCB Pesticides	No	0.5	ND	0.0002	Yes	0.5	ND
Tributyl Tin	Pesticide	No	0.01	12.60	0.005	Yes	0.01	Yes
1,2,4-Trichlorobenzene	Semi-Volatile	No	1	ND	NA	NA	NA	NA
1,1,1-Trichloroethane (Methyl Chloroform)	Volatiles	No	0.5	ND	NA	NA	NA	NA
1,1,2-Trichloroethane	Volatiles	No	0.5	ND	42	No	42	No
Trichloroethene (Trichloroethylene)	Volatiles	No	0.5	ND	81	No	81	No
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11, CFC 11)	Freon	No	NA	ND	NA	NA	NA	NA
2,4,6-Trichlorophenol	Semi-Volatile	No	10	0.63	6.5	Yes	10	No

APPENDIX C1

Table C-1 provides the results of an updated Reasonable Potential Analysis using data from 2002-2004

Table Appendix C-1 Reasonable Potential Analysis Update								
Constituent	**Type**	**2003 NPDES Permit RPA**	**Enclosure A Reporting Limit**	**Max Effluent 2002-2004** (ppb)	**Minimum CTR Criteria (ppb)**	**Reporting Limit greater than CTR?**	**Minimum Criteria**	**Greater than Minimum Criteria?**
Vinyl Chloride	Volatiles	No	0.5	ND	525	No	525	No
MTBE	Other	No	NA	ND	NA	NA	NA	NA
Dichlorodifluoromethane	Freon	No	NA	ND	NA	NA	NA	NA

NA = Not Applicable

ND = Not Detected

* = Detected Not Quantified

**Loading data for manganese and molybdenum from a 2005 special sampling study.

APPENDIX C2

Table C-2 provides a comparison of biosolids concentration data with California Hazardous Waste STLC limits.

Table Appendix C-2 Soluble Threshold Lower Concentration (STLC) Metals Comparison								
Constituent	**California Concentration STLC (mg/l)**	**Biosolids STLC CAM Metals E{A 600/700 Series (mg/l)**						**Biosolids Greater than STLC Limit?**
		3/5/02	**9/3/02**	**3/4/03**	**9/3/03**	**3/8/04**	**9/8/04**	
Antimony	15	<0.20	NA	NA	NA	<0.20	<0.20	No
Arsenic	5.0	0.59	3.2	1.2	NA	1.0	1.1	No
Barium	100	9.2	12	12	NA	13	8.3	No
Beryllium	0.75	<0.020	NA	<0.020	NA	<0.020	<0.20	No
Cadmium	1.0	1.3	0.17	0.15	NA	0.17	0.14	No
Chromium	5.0	0.18	2.7	2.2	NA	2.3	2.0	No
Cobalt	80	0.073	NA	0.24	NA	0.29	0.20	No
Copper	25	0.69	0.33	3.0	1.1	9.9	4.0	No
Lead	5.0	<0.10	1.5	1.6	0.81	2.0	1.1	No
Mercury	0.20	<0.00020	0.0005	<0.0050	NA	0.0074	0.00050	No
Molybdenum	350	1.3	NA	NA	NA	0.32	0.51	No
Nickel	20	<0.20	2.7	2.0	NA	2.4	2.3	No
Selenium	1.0	<0.040	NA	<0.20	NA	<0.20	<0.20	No
Silver	5.0	<0.20	<0.12	<0.040	NA	<0.040	0.040	No
Thallium	7.0	<0.10	NA	3.2	NA	1.5	1.4	No
Vanadium	24	0.77	1.2	1.1	NA	1.1	1.2	No
Zinc	250	27	68	59	NA	62	60	Yes

APPENDIX D1

The organic constituents included in the City's Total Toxic Organic Limits (TTO) were screened against 50% of the NPDES permit criteria and 50% ot the CTR Criteria in Table Appendix D-1.

Table Appendix D-1
Screening Total Toxic Organics with Water Quality Criteria

TTO Constituent	Max Influent (ppb)	Average Influent (ppb)	Max Effluent (ppb)	Average Effluent (ppb)	Minimum CTR Criteria (ppb)	NPDES Permit Daily Max (ppb)	NPDES Permit Monthly Average (ppb)	50 % Minimum Water Quality Criteria (ppb)	Reporting Limit (ppb)	Effluent > 50% Minimum Water Quality Criteria or Reporting Limit?
Acenaphthene	ND	ND	0.044	ND	2700	-	-	1350	2.0	No
Acenaphthylene	2.70	0.73	ND	ND	NA	-	-	NA	2.0	NA
Acrolein	ND	ND	ND	ND	780	-	-	390	2.0	No
Acrylonitrile	ND	ND	ND	ND	0.66	-	-	0.33	2.0	No
Aldrin	ND	ND	0.0032*	ND	0.00014	-	-	0.00007	0.005	No
Anthracene	ND	ND	ND	ND	110000	-	-	55000	2.0	No
Benzene	0.1 *	ND	ND	ND	71	-	-	35.5	0.5	No
Benzidine	ND	ND	ND	ND	0.00054	-	-	0.00027	5.0	No
Benzo(a) Anthracene	ND	ND	ND	ND	0.049	-	-	0.0245	5.0	No
Benzo(a)Pyrene	ND	ND	ND	ND	0.049	-	-	0.0245	2.0	No
Benzo(b) Fluoranthene	ND	ND	0.055*	ND	0.049	10	10	0.0245	10	No
Benzo(ghi) Perylene	ND	ND	ND	ND	NA	-	-	NA	0.1	NA
Benzo(k) Fluoranthene	ND	ND	ND	ND	0.049	-	-	0.0245	2	No
Bis (2-Chloroethoxy) Methane	1.4	ND	ND	ND	NA	-	-	NA	5	NA
Bis(2-Chloroethyl) Ether	ND	ND	0.29 *	ND	1.4	-	-	0.7	2	No
Bis(2-Chloroisopropyl) Ether	ND	ND	0.11 *	ND	170000	-	-	85000	2	No
Bis(2-Ethylhexyl) Phthalate	31.0	10.1	2 *	ND	5.9	-	-	2.95	5	No
Bromodichloromethane (Dichlorobromomethane)	1.5	0.4	5.9	3.3	46	-	-	23	0.5	No
Bromoform	0.5 *	ND	0.2 *	ND	360	-	-	180	0.5	No
Bromomethane (Methyl Bromide)	ND	ND	ND	ND	4000	-	-	2000	1.0	No

The organic constituents included in the City's Total Toxic Organic Limits (TTO) were screened against 50% of the NPDES permit criteria and 50% ot the CTR Criteria in Table Appendix D-1.

Table Appendix D-1

Screening Total Toxic Organics with Water Quality Criteria

4-Bromophenyl Phenyl Ether	ND	ND	ND	ND	NA	-	-	NA	5.0	NA
Butylbenzyl Phthalate	6	1.5	14	ND	5200	-	-	2600	10	No
Carbon Tetrachloride	ND	ND	ND	ND	4.4	-	-	2.2	0.5	No
Chlordane	ND	ND	ND	ND	0.00059	-	-	0.000295	0.1	No
Chlorobenzene (Monochlorobenzene)	ND	ND	ND	ND	21000	-	-	10500	0.5	No
Chloroethane	ND	ND	ND	ND	NA	-	-	NA	0.5	NA
2-Chloroethylvinyl Ether	ND	ND	ND	ND	NA	-	-	NA	1	NA
Chloroform	6.3	4.0	10	4.5	NA	-	-	NA	0.5	NA
Chloromethane (Methyl Chloride)	ND	ND	0.7 *	ND	NA	-	-	NA	0.5	NA
2-Chloronaphthalene	ND	ND	ND	ND	4300	-	-	2150	10	No
2-Chlorophenol	ND	ND	ND	ND	400	-	-	200	2	No
4-Chlorophenyl Phenyl Ether	ND	ND	ND	ND	NA	-	-	NA	5	NA
Chloropyrifos	NA	NA	ND	ND	NA	-	-	NA	?	NA
Chrysene	ND	ND	ND	ND	0.049	-	-	0.0245	5	No
Dibenzo(a,h) Anthracene	ND	ND	ND	ND	0.049	-	-	0.0245	0.5	No
Dibromochloromethane (Chlorodibromomethane)	2.3	0.8	3.5	1.65	34	-	-	17	0.5	No
4,4'-DDD	ND	ND	ND	ND	0.00084	-	-	0.00042	0.05	No
4,4'-DDE	ND	ND	ND	ND	0.00059	0.05	0.05	0.000295	0.05	No
4,4'-DDT	ND	ND	ND	ND	0.00059	-	-	0.000295	0.01	No
1,2-Dichlorobenzene	ND	ND	0.07 *	ND	17000	-	-	8500	0.5	No
1,3-Dichlorobenzene	ND	ND	.028 *	ND	2600	-	-	1300	0.5	No
1,4-Dichlorobenzene	5.1	3.2	0.7	0.5	2600	-	-	1300	0.5	No
3,3-Dichlorobenzidine	ND	ND	ND	ND	0.077	-	-	0.0385	5	No
1,1-Dichloroethane	ND	ND	ND	ND	NA	-	-	NA	0.5	NA
1,2-Dichloroethane	ND	ND	ND	ND	99	-	-	49.5	0.5	No
1,1-Dichloroethylene	ND	ND	ND	ND	3.2	-	-	1.6	0.5	No
1,2-Trans-Dichloroethylene	ND	ND	ND	ND	140000	-	-	70000	0.5	No
2,4-Dichlorophenol	0.22	ND	0.079	ND	790	-	-	395	5	No

APPENDIX D1

The organic constituents included in the City's Total Toxic Organic Limits (TTO) were screened against 50% of the NPDES permit criteria and 50% ot the CTR Criteria in Table Appendix D-1.

Table Appendix D-1 Screening Total Toxic Organics with Water Quality Criteria									
1,2-Dichloropropane (Propylene Dichloride)	ND	ND	ND	ND	39	-	-	19.5	0.5	No
Cis-1,3-dichloropropene	ND	ND	ND	ND	∑	-	-	-	0.5	
Trans 1,3-Dichloroproplyene	ND	ND	ND	ND	1700	-	-	850	0.5	No
Dieldrin	ND	ND	ND	0.002 *	0.00014	0.01	0.01	0.00007	0.01	No
Diethyl Phthalate	11	7.1	0.5	ND	120000	-	-	60000	2	No
Dimethyl Phthalate	0.37	ND	0.19	ND	2900000	-	-	1450000	2	No
2,4-Dimethylphenol	ND	0.56 *	ND	ND	2300	-	-	1150	1	No
Di-n-Butyl Phthalate	2.2	0.7	3.6	0.5	12000	-	-	6000	10	No
2,4-Dinitrophenol	ND	ND	ND	ND	14000	-	-	7000	5	No
2,4-Dinitrotoluene	ND	ND	ND	ND	9.10	-	-	4.55	5	No
2,6-Dinitrotoluene	ND	ND	ND	ND	NA	-	-	NA	5	NA
Di-n-Octyl Phthalate	0.83	ND	0.48	ND	NA	-	-	NA	10	NA
1,2-Diphenylhydrazine	5.30	ND	ND	ND	0.54	-	-	0.27	1	No
Endosulfan (alpha)	ND	ND	ND	ND	0.0087	-	-	0.00435	0.02	No
Endosulfan (beta)	ND	ND	ND	0.0056 *	0.0087	-	-	0.00435	0.01	No
Endosulfan Sulfate	ND	ND	ND	ND	240	-	-	120	0.05	No
Endrin	ND	ND	ND	ND	0.0023	-	-	0.00115	0.01	No
Endrin Aldehyde	ND	ND	ND	ND	0.81	-	-	0.405	0.01	No
Ethylbenzene	2.2	ND	ND	ND	29000	-	-	14500	0.5	No
Fluoranthene	0.10	ND	0.10	ND	370	-	-	185	0.05	No
Fluorene	ND	ND	0.0046 *	ND	14000	-	-	7000	0.1	No
Heptachlor	ND	ND	ND	ND	0.00021	-	-	0.000105	0.01	No
Heptachlor Epoxide	ND	ND	ND	0.0057 *	0.0001	0.01	0.01	0.00005	0.01	No
Alpha-BHC	ND	ND	ND	ND	0.013	-	-	0.0065	0.01	No
Beta-BHC	ND	ND	ND	ND	0.046	-	-	0.023	0.005	No
Delta-BHC	ND	ND	ND	ND	NA	-	-	NA	0.005	NA
Gamma-BHC (Lindane)	ND	ND	ND	0.014 *	0.063	-	-	0.0315	0.02	No
Hexachlorobenzene	ND	ND	ND	ND	0.00077	-	-	0.000385	1	No
Hexachlorobutadiene	ND	ND	ND	ND	50	-	-	25	1	No

APPENDIX D1

The organic constituents included in the City's Total Toxic Organic Limits (TTO) were screened against 50% of the NPDES permit criteria and 50% ot the CTR Criteria in Table Appendix D-1.

Table Appendix D-1										
Screening Total Toxic Organics with Water Quality Criteria										
Hexachlorocyclopentadiene	ND	ND	ND	ND	17000	-	-	8500	5	No
Hexachloroethane	ND	ND	ND	ND	8.9	-	-	4.45	1	No
Indeno(1,2,3-cd) Pyrene	0.098 *	ND	ND	ND	0.049	0.05	0.05	0.0245	0.05	No
Isophorone	1.0	ND	ND	ND	600	-	-	300	1	No
Methylene Chloride (Dichloromethane)	14.8	2.5	0.8	ND	1600	-	-	800	0.5	No
4,6-Dinitro, 2 Methylphenol	ND	ND	ND	ND	765	-	-	382.5	5	No
4-chloro, 3-Methylphenol (3-methyl, 4 chlorphenol)	0.83	ND	0.48	ND	NA	-	-	NA	1	NA
Naphthalene	0.96	0.21	0.079 *	ND	NA	-	-	NA	0.2	NA
Nitrobenzene	ND	ND	ND	ND	1900	-	-	950	1	No
2-Nitrophenol	ND	ND	0.093 *	ND	NA	-	-	NA	10	NA
4-Nitrophenol	ND	ND	0.21 *	ND	NA	-	-	NA	5	NA
N-Nitrosodimethylamine	15	ND	ND	ND	8.1	-	-	4.05	5	No
N-Nitrosodi-n-Propylamine	ND	ND	0.18 *	ND	1.4	-	-	0.7	5	No
N-Nitrosodiphenylamine	ND	ND	ND	ND	16	-	-	8	1	No
Aroclor 1016	ND	ND	ND	ND	∑PCB	-	-	NA	0.5	NA
Aroclor 1221	1.4	ND	ND	ND	∑PCB	-	-	NA	0.5	NA
Aroclor 1232	ND	ND	ND	ND	∑PCB	-	-	NA	0.5	NA
Aroclor 1242	ND	ND	ND	ND	∑PCB	-	-	NA	0.5	NA
Aroclor 1248	1.0	ND	ND	ND	∑PCB	-	-	NA	0.5	NA
Aroclor 1254	ND	ND	ND	ND	∑PCB	-	-	NA	0.5	NA
Aroclor 1260	ND	ND	ND	ND	∑PCB	-	-	NA	0.5	NA
Pentachlorophenol	ND	ND	ND	ND	8.2	-	-	4.1	1	No
Phenanthrene	0.11	ND	0.0094 *	ND	NA	-	-	NA	0.05	NA
Phenol	23.0	9.8	0.470	ND	4600000	-	-	2300000	1	No
Polychlorinated Biphenyls PCBs:	2.4	ND	ND	ND	0.00017	-	-	0.000085	0.5	No
Pyrene	ND	ND	ND	ND	11000	-	-	5500	0.05	No
2,3,7,8-tetra CDD (TCDD, Dioxin)	0.407 *	ND	0.406 *	ND	1.4E-08	-	-	7E-09		No
1,1,2,2-Tetrachloroethane	0.2 *	ND	ND	ND	11	-	-	5.5	0.5	No

APPENDIX D1

The organic constituents included in the City's Total Toxic Organic Limits (TTO) were screened against 50% of the NPDES permit criteria and 50% ot the CTR Criteria in Table Appendix D-1.

Table Appendix D-1 Screening Total Toxic Organics with Water Quality Criteria										
Tetrachloroethylene (Tetrachloroethene, Perchloroethylene)	4.1	ND	ND	ND	8.85	-	-	4.425	0.5	No
Toluene	7.5	3.8	0.70 *	0.34 *	200000	-	-	100000	0.5	No
Toxaphene	ND	ND	ND	ND	0.0002	-	-	0.0001	0.5	No
1,2,4-Trichlorobenzene	ND	ND	ND	ND	NA	-	-	NA	1	NA
1,1,1-Trichloroethane (Methyl Chloroform)	ND	ND	ND	ND	NA	-	-	NA	0.5	NA
1,1,2-Trichloroethane	ND	ND	ND	ND	42	-	-	21	0.5	No
Trichloroethene (Trichloroethylene)	0.5 *	ND	ND	ND	81	-	-	40.5	0.5	No
2,4,6-Trichlorophenol	ND	ND	0.63	ND	6.5	-	-	3.25	10	No
Vinyl Chloride	ND	ND	ND	ND	525	-	-	262.5	0.5	No

* = Detected but not quanitified

NA = Not applicable

ND = Not Detected

- = not available

APPENDIX D2

The organic constituents included in the City's Total Toxic Organic Limits (TTO) were screened against 25% of Inhibition Criteria in Table Appendix D-2.

Table Appendix D-2							
Comparison of Influent Concentrations to 25% of Inhibition Screening for TTO constituents							
TTO Constituent	**Maximum Influent (ppb)**	**Minimum CTR Criteria (ppb)**	**Activated Sludge Inhibition Threshold (ppb)**	**Nitrification Inhibition Threshold (ppb)**	**Anaerobic Digestion Inhibition Threshold (ppb)**	**25% Minimum Inhibition Critieria (ppb)**	**Influent Less than 25% of Inhibition Criteria?**
Anthracene	ND	110000	500000	-	-	125000	Yes
Benzene	0.1 *	71	100000	-	-	25000	Yes
Carbon Tetrachloride	ND	4.4	-	-	2000	500	Yes
Chlorobenzene (Monochlorobenzene)	ND	21000	-	-	960	240	Yes
Chloroform	6.3	NA	-	10000	1000	250	Yes
Chloromethane (Methyl Chloride)	ND	NA	-	-	3300	825	Yes
2-Chlorophenol	ND	400	5000	-	-	1250	Yes
1,2-Dichlorobenzene	ND	17000	5000	-	230	57.5	Yes
1,3-Dichlorobenzene	ND	2600	5000	-	-	1250	Yes
1,4-Dichlorobenzene	5.1	2600	5000	-	1400	350	Yes
2,4-Dichlorophenol	0.22	790	64000	64000	-	16000	Yes
2,4-Dimethylphenol	ND	2300	40000	150000	-	10000	Yes
2,4-Dinitrophenol	ND	14000	5000	-	-	1250	Yes
1,2-Diphenylhydrazine	5.30	0.54	5000	-	-	1250	Yes
Ethylbenzene	2.2	29000	200000	-	-	50000	Yes
Hexachlorobenzene	ND	0.00077	5000	-	-	1250	Yes
Hexachlorobutadiene	ND	50	-	-	3300	825	Yes
Naphthalene	0.96	NA	30000	-	-	7500	Yes
Pentachlorophenol	ND	8.2	950	-	200	50	Yes
Phenanthrene	0.11	NA	500000000	-	-	125000000	Yes
Phenol	23.0	4600000	50000	4000	-	1000	Yes

APPENDIX D2

The organic constituents included in the City's Total Toxic Organic Limits (TTO) were screened against 25% of Inhibition Criteria in Table Appendix D-2.

Table Appendix D-2 Comparison of Influent Concentrations to 25% of Inhibition Screening for TTO constituents							
Tetrachloroethylene (Tetrachloroethene, Perchloroethylene)	4.1	8.85	-	-	1000	25000	Yes
Toluene	7.5	200000	200000	-	-	50000	Yes
2,4,6-Trichlorophenol	ND	6.5	50000	-	-	12500	Yes

* = Detected but not quanitified

NA = Not applicable

ND = Not Detected

- = not available

APPENDIX D3

The organic constituents included in the City's Total Toxic Organic Limits (TTO) were screened against California Hazardous Waste Soluble Threshold Levels (STLC) in Table Appendix D-3.

Table Appendix D-3 Comparison of Influent Concentrations to STLC for TTO constituents				
TTO Constituent	**Max Influent (ppb)**	**Average Influent (ppb)**	**California Hazardous Waste STLC (mg/l)**	**Influent Less than STLC?**
Aldrin	ND	ND	0.14	Yes
Benzene	0.1 *	ND	0.50	Yes
Carbon Tetrachloride	ND	ND	0.50	Yes
Chlordane	ND	ND	0.03	Yes
Chlorobenzene (Monochlorobenzene)	ND	ND	1.0E+02	Yes
2-Chloroethylvinyl Ether	ND	ND	6.0	Yes
4,4'-DDD	ND	ND	0.10	Yes
4,4'-DDE	ND	ND	0.10	Yes
4,4'-DDT	ND	ND	0.10	Yes
1,4-Dichlorobenzene	5.1	3.2	7.5	Yes
1,2-Dichloroethane	ND	ND	0.50	Yes
1,1-Dichloroethylene	ND	ND	0.70	Yes
Dieldrin	ND	ND	0.80	Yes
Diethyl Phthalate	11	7.1	1.0E-03	Yes
2,4-Dinitrotoluene	ND	ND	0.13	Yes
Endrin	ND	ND	0.02	Yes
Heptachlor	ND	ND	8.0E-03	Yes
Heptachlor Epoxide	ND	ND	8.0E-03	Yes
Gamma-BHC (Lindane)	ND	ND	0.40	Yes
Hexachlorobenzene	ND	ND	0.13	Yes
Hexachlorobutadiene	ND	ND	0.50	Yes

APPENDIX D3

The organic constituents included in the City's Total Toxic Organic Limits (TTO) were screened against California Hazardous Waste Soluble Threshold Levels (STLC) in Table Appendix D-3.

Table Appendix D-3				
Comparison of Influent Concentrations to STLC for TTO constituents				
Hexachloroethane	ND	ND	3.0	Yes
Aroclor 1016	ND	ND	5.0	Yes
Aroclor 1221	1.4	ND	5.0	Yes
Aroclor 1232	ND	ND	5.0	Yes
Aroclor 1242	ND	ND	5.0	Yes
Aroclor 1248	1.0	ND	5.0	Yes
Aroclor 1254	ND	ND	5.0	Yes
Aroclor 1260	ND	ND	5.0	Yes
Pentachlorophenol	ND	ND	1.7	Yes
Tetrachloroethylene (Tetrachloroethene, Perchloroethylene)	4.1	ND	0.70	Yes
Toxaphene	ND	ND	0.50	Yes
Trichloroethene (Trichloroethylene)	0.5 *	ND	2.0E+02	Yes
2,4,6-Trichlorophenol	ND	ND	2.0	Yes
Vinyl Chloride	ND	ND	0.20	Yes

* = Detected but not quanitified
NA = Not applicable
ND = Not Detected
- = not available

APPENDIX D4

The organic constituents included in the City's Total Toxic Organic Limits (TTO) were screened Health and Safety Criteria in Tables Appendix D-4 and D-5.

All TTO's must be below the Health and Safety Fume Toxicity Discharge Screening Levels.

Table Appendix D-4

Comparison of Health and Safety Toxicity Exposure Limits to Volatile Organics Detected in Influent

Constituent	Maximum Influent (ppb)	Exposure limit (ppm)	Conversion Factor (mg^3/mg per ppm)	Exposure Limit (mg/m^3)	Henry's Law Constant (mg/m^3 per mg/L)	Discharge Screening Level (ppb)	Source of Exposure Limits
Benzene	0.1 *	1	3.19	3.19	228	14	REL-STEL
Bis (2-ethylhexyl) Phthalate (Diocytl Phathalate)	31.0	-	-	5	4.4	1100	PEL-TWA
Bromoform	0.5 *	0.5	10.34	5.17	23	230	PEL-TWA, TLV-TWA, REL-TWA
Chloroform	6.3	2	4.88	9.76	164	60	REL-STEL
Di-Butyl Phthalate	2.2	5	11.57	57.85	4.4	13000	PEL-TWA
Dichlorobenzenes	5.1	76	6.01	456.76	109	4200	PEL-TWA
Diethyl Phthalate	11	-	-	5	0.035	140000	REL-TWA
Dimethyl Phthalate	0.37	-	-	5	0.014	360000	PEL-TWA
Ethylbenzene	2.2	100	4.34	434	327	1300	TLV-STEL, REL-STEL
Isophorone	1.0	4	5.65	22.6	0.24	93000	REL-TWA
Methylene Chloride (Dichloromethane)	14.8	125	3.47	433.75	105	4100	PEL-STEL
Napthalene	0.96	10	5.24	52.4	20	2700	PEL-TWA
Phenathrene	0.11	NA	NA	0.1	0.45	220	Ca - TWA
Phenol	23.0	5	3.85	19.25	0.02	880000	PEL-TWA
1,1,2,2-Tetrachloroethane	0.2 *	5	6.87	34.35	19	1800	PEL-TWA
Tetrachloroethylene (Perchloroethylene)	4.1	100	6.78	678	717	950	TLV-STEL
Toluene	7.5	150	3.77	565.5	273	2100	REL-STEL
Trichloroethene (Trichloroethylene)	0.5 *	2	5.37	10.74	409	26	REL-Ceiling

* Detected but not quantified

- Not Available

APPENDIX D5

The orgsnic constituents included in the City's Total Toxic Organic Limits (TTO) were screened gainst Health and Safety Criteria in Tables Appendix D-4 and D-5.

Any detected volatile compound were reviewed with the applicable Lower Explositivity Limits. Constituents should be less than 10% of these limits

Table Appendix D-5

Comparison of Lower Explositivity Limits to Volatile Organics Detected in Influent

TTO Constituent	Maximum Influent (ppb)	LEL % Vol/Vol	LEL mol/m3	Henry's Law Constant (mol/m3)/(mg/L)	MW (g/mol)	LEL (mg/l)	10% of LEL (ppb)
Benzene	0.1 *	1.2	0.49	2.90E-03	78.1	1.689E+02	17000
Bis (2-ethylhexyl) Phthalate (Diocytl Phathalate)	31.0	0.3	0.12	1.12E-05	390.4	1.096E+04	1095790
Di-Butyl Phthalate	2.2	0.5	0.20	1.56894E-05	278	1.301E+04	1300000
Dichlorobenzenes	5.1	2.5	1.02	7.42E-04	147	1.375E+03	138000
Diethyl Phthalate	11	0.7	0.29	1.55E-07	222.3	1.839E+06	180000000
Dimethyl Phthalate	0.37	0.9	0.37	7.11E-08	194.2	5.164E+06	520000000
Ethylbenzene	2.2	0.8	0.33	3.10E-03	106.2	1.053E+02	11000
Isophorone	1.0	0.8	0.33	1.76E-06	138.2	1.851E+05	19000000
Methylene Chloride (Dichloromethane)	14.8	13	5.31	1.20E-03	84.9	4.421E+03	440000
Napthalene	0.96	0.9	0.37	1.54E-04	128.2	2.386E+03	239000
Phenol	23.0	1.8	0.73	2.32E-07	94.1	3.169E+06	320000000
Toluene	7.5	1.1	0.45	3.00E-03	92.1	1.496E+02	15000
Trichloroethene (Trichloroethylene)	0.5 *	8	3.26	2.10E-03	131.4	1.555E+03	155000

LEL% = Lower Explositivity Limit Percent by Volume

LEL% Vol/Vol = LEL% mole/mole

LEL mole/m3 = LEL% mole/mole X 0.408 mol air/m^3 air (column 2)

LEL mg/l = LEL mol/m3/Henry''s Law Constant (column 3)

APPENDIX E1

Beryllium Removal Rate Calculations

Because only effluent concentration data was available for beryllium, the influent values were calculated using a mass based approach from biosolids information The effluent concentration was converted to loading using the 116.6 MGD influent flow rate:

Max Be Effluent w/ Influent Flow =	0.28
Average Be Effluent with influent Flow Loading=	0.07

Then influent loading is calculated based on adding the pounds per day biosolids loading to these values.

Average Be Biosolids Concentration 2002-2004 =	0.32 mg/kg
Biosolids loading =	119 metric tons
Biosolids Be loading =	0.08 ppd

Influent Be Loading = Effluent w/Inlfluent Flow + Biosolids Be Loading

Max Be Influent Loading =	0.36 ppd
Average Be Influent Loading=	0.15 ppd
Maximum Influent Loading Concentration=	0.37 ppb
Average Be Influent Loading Concentration =	0.16 ppb

The removal rate calculation is based on mean removal efficiency.

Removal Rate = (Average Be Influent Con- Average Be Effluent Con)/Average Be Influent Con

Average Effluent Concentration =	0.07 ppb

Removal Rate = (0.16ppd -0.07 ppb)/0.16 ppb

Removal Rate =	55%

APPENDIX E2

Table Appendix E-2

Arsenic Removal Rate Calculations

Date	Arsenic Influent (ppb)	Arsenic Effluent (ppb)	Removal Rate	Removal Rate in Rank Order	Rank
2/5/02	1.9	0.9	53%	19%	1
3/5/02	3.0	1.1	63%	24%	2
4/2/02	3.0	0.8	73%	29%	3
5/7/02	3.1	0.7	77%	30%	4
6/4/02	2.7	1.2	56%	36%	5
7/1/02	2.6	1.1	58%	44%	6
8/6/02	4.8	1.3	73%	45%	7
9/3/02	2.2	1	55%	47%	8
10/1/02	2.8	1.3	54%	50%	9
11/5/02	3.3	1.2	64%	53%	10
12/3/02	2.7	1.5	44%	53%	11
1/7/03	2.1	0.8	62%	54%	12
2/4/03	2.2	1.4	36%	54%	13
3/4/03	2	1.4	30%	55%	14
4/1/03	2.8	1.0	64%	55%	15
5/6/03	2.8	1.2	57%	56%	16
6/3/03	2.2	0.9	59%	57%	17
7/1/03	2.8	1.1	61%	58%	18
8/5/03	1.7	0.6	65%	59%	19
9/3/03	1.6	0.8	50%	59%	20
10/7/03	1.9	0.9	53%	60%	21
11/4/03	1.2	0.4	67%	61%	22
12/2/03	1.9	0.7	63%	62%	23
1/6/04	1.7	1.2	29%	62%	24
2/5/04	2.1	1.6	24%	63%	25
3/8/04	2	0.9	55%	63%	26
4/6/04	2.6	1	62%	64%	27
5/3/04	1.7	0.9	47%	64%	28
6/9/04	1.1	0.6	45%	65%	29
7/7/04	1.6	1.3	19%	65%	30
8/10/04	1.3	0.6	54%	67%	31
9/8/04	1.7	0.6	65%	73%	32
10/4/04	1.5	0.4	73%	73%	33
11/8/04	1.5	0.6	60%	73%	34
12/9/04	1.7	0.7	59%	77%	35

Total Number of Samples   35
Median =   58%
Mean =   55%

To calculate the removal rate at the 3rd decile
Rank of 3rd decile = Sample Size* (30%) = 35*(0.3) =   10.5
Used linear regression to compute the appropriate percentile

3rd Decile Effluent Removal Rate =   53%

APPENDIX E3

	Table: Appendix E-3 Cadmium Removal Rate Calculations							
Date	Cadmium Actual Influent (ppb)	Cadmium MR* Influent (ppb)	Ea (ppb)	MDLa (ppb)	Cadmium Effluent** (ppb)	Removal Rates	Removal Rates in Rank Order	Rank
1/2/02	ND	0.07	ND	0.02	0.01	NA	50.1%	1
2/5/02	ND	0.09	ND	0.02	0.01	NA	56.3%	2
3/5/02	ND	0.10	ND	0.02	0.01	NA	57.6%	3
4/2/02	ND	0.12	ND	0.02	0.01	NA	60.9%	4
5/7/02	0.35	0.35	0.04	0.02	0.04	88.5%	60.9%	5
6/4/02	0.38	0.38	0.04	0.02	0.04	90.5%	69.9%	6
7/1/02	ND	0.13	ND	0.02	0.01	NA	70.7%	7
8/6/02	0.70	0.70	ND	0.02	0.01	98.6%	75.7%	8
9/3/02	ND	0.14	ND	0.02	0.01	NA	79.7%	9
10/1/02	ND	0.15	ND	0.02	0.01	NA	82.3%	10
11/5/02	ND	0.16	ND	0.02	0.01	NA	82.7%	11
12/3/02	0.50	0.50	0.15	0.02	0.15	69.9%	83.3%	12
1/7/03	0.70	0.70	ND	0.02	0.01	98.6%	84.8%	13
2/4/03	ND	0.17	ND	0.02	0.01	NA	88.5%	14
3/4/03	0.29	0.29	0.03	0.02	0.03	89.7%	89.7%	15
4/1/03	1.30	1.30	0.23	0.02	0.23	82.3%	90.5%	16
5/6/03	ND	0.18	ND	0.02	0.01	NA	90.7%	17
6/3/03	0.32	0.32	0.14	0.02	0.14	56.3%	95.0%	18
7/1/03	0.30	0.30	0.05	0.02	0.05	83.3%	95.3%	19
8/5/03	ND	0.19	ND	0.02	0.01	NA	96.3%	20
9/3/03	1.10	1.10	ND	0.02	0.01	99.1%	98.6%	21
10/7/03	0.26	0.26	0.04	0.02	0.04	84.8%	98.6%	22
11/4/03	0.27	0.45	0.19	0.02	0.19	57.6%	99.1%	23
12/2/03	0.45	0.27	0.08	0.02	0.08	70.7%	NA	NA
1/6/04	ND	0.21	ND	0.02	0.01	NA	NA	NA
2/5/04	0.38	0.38	0.15	0.03	0.15	60.9%	NA	NA
3/8/04	0.36	0.36	0.18	0.03	0.18	50.1%	NA	NA
4/6/04	0.30	0.30	0.06	0.03	0.06	79.7%	NA	NA
5/3/04	0.36	0.36	0.14	0.03	0.14	60.9%	NA	NA
5/26/04	0.32	0.32	0.03	0.03	0.03	90.7%	NA	NA
6/9/04	0.32	0.32	ND	0.03	0.02	95.3%	NA	NA
7/7/04	0.29	0.29	0.07	0.03	0.07	75.7%	NA	NA
8/10/04	0.29	0.29	0.05	0.03	0.05	82.7%	NA	NA
9/8/04	0.30	0.30	ND	0.03	0.02	95.0%	NA	NA
10/4/04	ND	0.11	ND	0.03	0.02	NA	NA	NA
11/8/04	0.40	0.40	ND	0.03	0.02	96.3%	NA	NA
11/17/04	ND	0.15	ND	0.03	0.02	NA	NA	NA
12/9/04	ND	0.18	ND	0.03	0.02	NA	NA	NA

* Replaced Influent Non-Detects with Calculated ROS/MR Method Values

** Replaced Effluent Non-Detects with 1/2 detection limit

*** Did not calculate removal rate for influent/effleunt non-detected pair.

Number of Samples = 23
Median Removal Rate = 83%
Mean Removal Rate= 81%

To calculate the removal rate at the 3rd decile
Rank of 3rd decile = Sample Size* (30%) = 23*(0.3) =   6.9
Since the Rank of the 3rd Decile is a whole number, no linear regression required

3rd Decile Effluent Removal Rate =   71%

APPENDIX E4

	Table Appendix E-4
	Chromium Removal Rate Calculations

Date	Chromium Influent (ppb)	Chromium Effluent (ppb)	Chromium MR Effluent* (ppb)	Removal Rate	Removal Rate in Ascending Rank Order	Rank
1/2/02	6.2	0.47	0.50	92%	48%	1
2/5/02	4.9	0.56	0.60	88%	81%	2
3/5/02	10.4	0.64	0.70	93%	82%	3
4/2/02	5.3	0.62	0.65	88%	85%	4
5/7/02	5.4	0.42	0.50	91%	86%	5
6/4/02	5.7	0.45	0.50	91%	87%	6
7/1/02	4.6	0.40	0.49	89%	88%	7
8/6/02	8.8	0.49	0.59	93%	88%	8
9/3/02	7.1	0.64	0.70	90%	88%	9
10/1/02	7	0.48	0.56	92%	89%	10
11/5/02	8.2	0.59	0.60	93%	89%	11
12/3/02	7.4	0.62	0.67	91%	89%	12
1/7/03	10.3	0.80	0.80	92%	89%	13
2/4/03	6.6	0.80	0.83	87%	89%	14
3/4/03	7.7	1.00	1.48	81%	89%	15
4/1/03	4.8	0.80	0.88	82%	90%	16
5/6/03	8	0.60	0.62	92%	90%	17
6/3/03	5.7	0.60	0.62	89%	91%	18
7/1/03	14	0.50	0.60	96%	91%	19
8/5/03	5.4	0.70	0.80	85%	91%	20
9/3/03	7.2	0.40	0.47	93%	91%	21
10/7/03	6.4	0.40	0.48	92%	92%	22
11/4/03	1	0.47	0.52	48%	92%	23
12/2/03	5.6	0.72	0.80	86%	92%	24
1/6/04	5.8	0.47	0.56	90%	92%	25
2/5/04	35.3	1.48	1.70	95%	92%	26
3/8/04	6.6	0.67	0.80	88%	92%	27
4/6/04	9.3	0.88	1.00	89%	93%	28
5/3/04	8	0.83	0.90	89%	93%	29
5/26/04	11	<2	0.60	95%	93%	30
6/9/04	8.8	0.56	0.60	93%	93%	31
7/7/04	9.2	0.52	0.60	93%	93%	32
8/10/04	6.6	0.65	0.72	89%	93%	33
9/8/04	8.1	0.50	0.60	93%	93%	34
10/4/04	7.1	0.50	0.60	92%	94%	35
11/8/04	9.3	0.70	0.80	91%	95%	36
11/17/04	5.6	0.60	0.64	89%	95%	37
12/9/04	11.5	0.60	0.64	94%	96%	38

* MR Effluent Data contains data that estimated non-detects based on the ROS MR Method

Total Number of Samples	38
Median =	91%
Mean =	89%

To calculate the removal rate at the 3rd decile
Rank of 3rd decile = Sample Size* (30%) = 38*(0.3) =   11.4
Since the Rank of the 3rd decile is a whole number, no linear regression required.

3rd Decile Effluent Removal Rate =   89%

APPENDIX E5

Date	Copper Influent (ppb)	Copper Effluent* (ppb)	Removal Rate	Removal Rate in Ascending Rank Order	Rank
Table Appendix E-5					
Copper Removal Rate					
1/2/02	92.3	3.2	97%	92%	1
1/8/02	78.0	3.4	96%	93%	2
1/15/02	81.4	4.0	95%	94%	3
1/22/02	64.9	2.9	96%	94%	4
1/29/02	81.0	3.7	95%	94%	5
2/5/02	80.5	5.2	94%	94%	6
2/12/02	65.1	4.9	92%	95%	7
2/19/02	93.6	3.9	96%	95%	8
2/26/02	96.3	4.1	96%	95%	9
3/5/02	144.0	4.1	97%	95%	10
3/12/02	93.7	4.2	96%	95%	11
3/19/02	88.4	5.4	94%	95%	12
3/26/02	123.0	4.0	97%	95%	13
4/2/02	114.0	3.7	97%	95%	14
4/9/02	79.6	3.0	96%	95%	15
4/16/02	120.0	3.3	97%	95%	16
4/23/02	65.7	4.0	94%	96%	17
4/30/02	125.0	3.9	97%	96%	18
5/7/02	96.3	3.4	96%	96%	19
5/14/02	93.0	4.6	95%	96%	20
5/21/02	85.4	2.7	97%	96%	21
5/28/02	83.5	2.5	97%	96%	22
6/4/02	128.0	2.1	98%	96%	23
6/11/02	83.8	2.0	98%	96%	24
6/18/02	79.8	2.3	97%	96%	25
6/25/02	117.0	3.3	97%	96%	26
7/1/02	75.5	2.5	97%	96%	27
7/9/02	99.9	2.4	98%	96%	28
7/16/02	85.6	2.2	97%	96%	29
7/23/02	87.3	2.1	98%	96%	30
7/30/02	90.4	2.5	97%	96%	31
8/6/02	122.0	2.4	98%	96%	32
8/13/02	60.6	2.4	96%	97%	33
8/20/02	73.7	2.2	97%	97%	34
8/27/02	85.6	2	98%	97%	35
9/3/02	156.0	2.2	99%	97%	36
9/10/02	89.4	2.3	97%	97%	37
9/17/02	122.0	2.6	98%	97%	38
9/24/02	76.6	1.2	98%	97%	39
10/1/02	146.0	1.6	99%	97%	40
10/8/02	84.6	1.4	98%	97%	41
10/15/02	83.8	2.5	97%	97%	42
10/22/02	80.3	3.7	95%	97%	43
10/29/02	87.6	2.7	97%	97%	44
11/5/02	82.9	3.9	95%	97%	45
11/12/02	67.8	3.6	95%	97%	46
11/19/02	93.5	3.1	97%	97%	47
11/26/02	98.3	2.2	98%	97%	48

APPENDIX E5

Date	Copper Influent (ppb)	Copper Effluent* (ppb)	Removal Rate	Removal Rate in Ascending Rank Order	Rank
Table Appendix E-5 Copper Removal Rate					
12/3/02	122.0	4.0	97%	97%	49
12/10/02	80.8	2.3	97%	97%	50
12/17/02	78.8	1.7	98%	97%	51
12/25/02	63.9	4.4	93%	97%	52
1/7/03	135.0	2.3	98%	97%	53
1/14/03	93.4	3	97%	97%	54
1/21/03	62.5	2.4	96%	97%	55
1/28/03	108.0	2.1	98%	97%	56
2/4/03	96.1	3.3	97%	97%	57
2/11/03	95.5	2.6	97%	97%	58
2/18/03	120.0	2.5	98%	97%	59
2/25/03	154.0	3.4	98%	97%	60
3/4/03	83.7	3.1	96%	97%	61
3/11/03	98.0	3	97%	97%	62
3/18/03	105.0	2.5	98%	97%	63
3/24/03	80.3	3.6	96%	97%	64
4/1/03	95.2	2.6	97%	97%	65
4/9/03	103.0	3.1	97%	97%	66
4/17/03	80.7	1.8	98%	97%	67
4/25/03	64.9	3	95%	97%	68
5/1/03	116.0	2.4	98%	97%	69
5/6/03	111.0	2.1	98%	97%	70
5/13/03	86.9	1.8	98%	97%	71
5/20/03	96.5	1.6	98%	97%	72
5/27/03	96.6	1.6	98%	97%	73
6/3/03	95.7	2.2	98%	97%	74
6/10/03	146.0	2.1	99%	98%	75
6/17/03	116.0	3.9	97%	98%	76
6/24/03	115.0	2.6	98%	98%	77
7/1/03	78.1	2.2	97%	98%	78
7/8/03	87.8	2.0	98%	98%	79
7/15/03	77.4	3.8	95%	98%	80
7/22/03	144.0	2.0	99%	98%	81
7/29/03	86.7	2.1	98%	98%	82
8/5/03	99.5	1.6	98%	98%	83
8/12/03	91.1	2.0	98%	98%	84
8/19/03	96.6	2.7	97%	98%	85
8/26/03	78.5	2.2	97%	98%	86
9/3/03	117.0	1.8	98%	98%	87
9/9/03	98.3	3.7	96%	98%	88
9/16/03	98.9	4.8	95%	98%	89
9/23/03	194.0	2.2	99%	98%	90
9/30/03	132.0	2.1	98%	98%	91
10/7/03	71.7	3.1	96%	98%	92
10/14/03	128.0	2.2	98%	98%	93
10/21/03	89.9	2.3	97%	98%	94
10/28/03	141.0	1.6	99%	98%	95
11/4/03	106.0	2.4	98%	98%	96

APPENDIX E5

Date	Copper Influent (ppb)	Copper Effluent* (ppb)	Removal Rate	Removal Rate in Ascending Rank Order	Rank
Table Appendix E-5 Copper Removal Rate					
12/2/03	109.0	5.4	95%	98%	97
1/6/04	83.0	4.8	94%	98%	98
2/5/04	144.0	3.4	98%	98%	99
3/8/04	96.0	2.6	97%	98%	100
4/6/04	88.0	3.1	96%	98%	101
5/3/04	88.0	2.2	98%	98%	102
5/26/04	193.0	0.5	100%	98%	103
6/9/04	133.0	2.4	98%	98%	104
7/7/04	132.0	1.5	99%	98%	105
8/3/04	236.0	2.5	99%	98%	106
8/10/04	85.0	1.7	98%	98%	107
8/18/04	105.0	3.1	97%	98%	108
8/23/04	109.0	3.6	97%	98%	109
8/31/04	74.0	1.6	98%	98%	110
9/8/04	142.0	2.5	98%	98%	111
9/15/04	92.0	2.9	97%	98%	112
9/20/04	108.0	2.2	98%	98%	113
9/28/04	96.0	1.6	98%	98%	114
9/8/04	142.0	2.5	98%	98%	115
9/15/04	92.0	2.9	97%	98%	116
9/20/04	108.0	2.2	98%	98%	117
9/28/04	96.0	1.6	98%	98%	118
10/4/04	87.0	1.6	98%	98%	119
10/12/04	83.0	1.5	98%	98%	120
10/20/04	76.0	1.9	98%	98%	121
10/25/04	87.0	2.8	97%	98%	122
11/2/04	99.0	2.6	97%	98%	123
11/8/04	100.0	1.9	98%	99%	124
11/16/04	81.0	2.6	97%	99%	125
11/17/04	71.5	2.3	97%	99%	126
11/22/04	71.0	2.7	96%	99%	127
11/30/04	99.0	3.4	97%	99%	128
12/9/04	85.0	2	98%	99%	129
12/13/04	80.0	2.1	97%	99%	130
12/20/04	85.0	3.0	96%	99%	131
12/27/04	79.0	1.9	98%	100%	132

*One value 5/26/04 was below the detection limit of 0.5 ug/l.

Total Number of Samples   132
Median =   97%
Mean =   97%

To calculate the removal rate at the 3rd decile
Rank of 3rd decile = Sample Size* (30%) = 132*(0.3) =   39.6
Used linear regression to compute the appropriate percentile

3rd Decile Effluent Removal Rate =   97%

APPENDIX E6

Date	Lead Influent (ppb)	Lead Effluent (ppb)	Removal Rate	Removal Rate in Ascending Rank Order	Rank
Table Appendix E-6 Lead Removal Rate Calculations					
1/2/02	5.0	0.40	92%	69%	1
2/5/02	3.0	0.20	93%	74%	2
3/5/02	6.0	0.20	97%	75%	3
4/2/02	8.0	0.69	91%	84%	4
5/7/02	6.0	0.73	88%	84%	5
6/4/02	5.0	0.36	93%	85%	6
7/1/02	4.0	0.20	95%	86%	7
8/6/02	7.0	0.20	97%	87%	8
9/3/02	6.0	0.20	97%	87%	9
10/1/02	6.0	0.20	97%	88%	10
11/5/02	5.0	0.20	96%	88%	11
12/3/02	8.0	0.64	92%	88%	12
1/7/03	6.0	0.80	87%	88%	13
2/4/03	6.0	0.60	90%	88%	14
3/4/03	5.0	0.60	88%	90%	15
4/1/03	5.0	1.27	75%	91%	16
5/6/03	5.0	0.80	84%	91%	17
6/3/03	5.0	0.80	84%	91%	18
7/1/03	9.0	0.70	92%	92%	19
8/5/03	4.0	0.20	95%	92%	20
9/3/03	8.0	0.50	94%	92%	21
10/7/03	4.0	0.50	88%	93%	22
11/4/03	7.0	0.60	91%	93%	23
12/2/03	7.0	0.20	97%	93%	24
1/6/04	5.0	0.60	88%	93%	25
2/5/04	8.0	0.50	94%	94%	26
3/8/04	8.0	0.70	91%	94%	27
4/6/04	5.0	0.70	86%	94%	28
5/3/04	4.0	1.04	74%	95%	29
6/9/04	8.0	2.45	69%	95%	30
7/7/04	6.0	0.70	88%	96%	31
8/10/04	6.0	0.80	87%	97%	32
9/8/04	6.0	0.90	85%	97%	33
10/4/04	9.0	0.65	93%	97%	34
11/8/04	7.0	0.41	94%	97%	35
12/9/04	6.3	0.45	93%	97%	36

Total Number of Samples   36
Median =   92%
Mean =   90%

To calculate the removal rate at the 3rd decile
Rank of 3rd decile = Sample Size* (30%) = 36*(0.3) =   10.8
Used linear regression to compute the appropriate percentile

3rd Decile Effluent Removal Rate =   88%

APPENDIX E7

Table Appendix E-7 Manganese Removal Rate Calculation		
Date	**Manganese Influent (ppb)**	**Manganese Final Effluent (ppb)**
8/4/05	107	0.0417
9/1/05	104	
9/2/05	90.6	
9/3/05	75.2	
9/4/05	101	
9/5/05	113	
9/6/05	102	
9/7/05	116	0.0266
10/3/05	112	
10/4/05	108	9
10/5/05	99.2	0.0305
10/6/05	97.7	
10/7/05	115	
10/8/05	89.7	
10/9/05	83.9	
10/10/05	85.2	
10/11/05	83	
10/12/05	97.5	
10/13/05	104	
10/14/05	107	
10/16/05	108	
10/17/05	125	
10/18/05	106	
10/19/05	109	
11/7/05	NA	0.0235
Mean	102	1.9

Manganese does not have enough effluent data to perform a 3rd Efficiency Removal Calculation. Therefore, the mean efficiency removal rate was instead calculated.

Mn MEERR = Manganese Mean Efficiency Removal Rate
Mn ERR = (Mean Influent - Mean Final Effluent)/Mean Influent
Mn FEMERR = (102 ppb - 1.9 ppb)/*102 ppb
Mn FEMERR =   98%

APPENDIX E8

Table Appendix E-8					
Mercury Removal Rate Calculations					
Date	Mercury Influent (ppb)	Mercury Effluent (ppb)	Removal Rate	Removal Rate in Ascending Rank Order	Rank
1/2/02	0.415	0.002	100%	98%	1
2/5/02	0.349	0.003	99%	99%	2
3/5/02	0.118	0.001	99%	99%	3
4/2/02	0.197	0.003	99%	99%	4
5/7/02	0.415	0.002	99%	99%	5
6/4/02	0.294	0.002	99%	99%	6
7/1/02	0.374	0.002	99%	99%	7
8/6/02	0.272	0.002	99%	99%	8
9/3/02	0.250	0.001	100%	99%	9
10/1/02	0.495	0.001	100%	99%	10
11/5/02	0.460	0.003	99%	99%	11
12/3/02	0.260	0.003	99%	99%	12
1/7/03	0.278	0.001	100%	99%	13
2/4/03	0.459	0.002	100%	99%	14
3/4/03	0.230	0.002	99%	99%	15
4/1/03	1.070	0.002	100%	99%	16
5/6/03	0.238	0.001	100%	99%	17
6/3/03	0.284	0.002	99%	99%	18
7/1/03	0.417	0.002	100%	99%	19
8/5/03	0.309	0.001	100%	99%	20
9/3/03	0.373	0.003	99%	99%	21
10/7/03	0.418	0.002	100%	99%	22
11/4/03	0.271	0.002	99%	99%	23
12/2/03	0.341	0.002	99%	99%	24
1/6/04	0.237	0.002	99%	99%	25
2/5/04	0.171	0.002	99%	100%	26
3/8/04	0.255	0.002	99%	100%	27
4/6/04	0.237	0.003	99%	100%	28
5/3/04	0.104	0.002	98%	100%	29
6/9/04	0.309	0.002	99%	100%	30
7/7/04	0.302	0.002	99%	100%	31
8/10/04	0.482	0.002	100%	100%	32
9/8/04	0.277	0.002	99%	100%	33
10/4/04	0.188	0.001	99%	100%	34
11/8/04	0.233	0.001	99%	100%	35
12/9/04	0.304	0.002	99%	100%	36

Total Number of Samples =   36
Median =   99%
Mean =   99%

To calculate the removal rate at the 3rd decile
Rank of 3rd decile = Sample Size* (30%) = 36*(0.3) =   10.8
Used linear regression to compute the appropriate percentile

3rd Decile Effluent Removal Rate =   99%

APPENDIX E9

Table Appendix E-9					
Nickel Removal Rate Calculations					
Date	Nickel Influent (ppb)	Nickel Effluent (ppb)	Removal Rate	Removal Rate in Ascending Rank	Rank
1/2/02	11	4	64%	7%	1
1/8/02	14	6	57%	29%	2
1/15/02	13	5	62%	33%	3
1/22/02	10	5	50%	33%	4
1/29/02	15	7	53%	36%	5
2/5/02	13	6	54%	36%	6
2/12/02	11	5	55%	38%	7
2/19/02	19	6	68%	38%	8
2/26/02	23	6	74%	38%	9
3/5/02	15	6	60%	38%	10
3/12/02	20	6	70%	40%	11
3/19/02	15	5	67%	40%	12
3/26/02	18	6	67%	40%	13
4/2/02	13	7	46%	44%	14
4/9/02	14	5	64%	44%	15
4/16/02	17	6	65%	44%	16
4/23/02	9	4	56%	44%	17
4/30/02	15	6	60%	45%	18
5/7/02	13	6	54%	45%	19
5/14/02	14	6	57%	45%	20
5/21/02	14	7	50%	45%	21
5/28/02	9	5	44%	45%	22
6/4/02	12	4	67%	45%	23
6/11/02	13	6	54%	45%	24
6/18/02	11	6	45%	46%	25
6/25/02	16	6	63%	46%	26
7/1/02	9	5	44%	47%	27
7/9/02	13	5	62%	50%	28
7/16/02	15	7	53%	50%	29
7/23/02	11	6	45%	50%	30
7/30/02	14	5	64%	50%	31
8/6/02	14	5	64%	50%	32
8/13/02	10	5	50%	50%	33
8/20/02	11	6	45%	50%	34
8/27/02	11	5	55%	50%	35
9/3/02	14	4	71%	50%	36
9/10/02	15	8	47%	50%	37
9/17/02	17	6	65%	50%	38
9/24/02	20	8	60%	50%	39
10/1/02	19	6	68%	50%	40
10/8/02	13	5	62%	50%	41
10/15/02	13	7	46%	50%	42
10/22/02	12	6	50%	50%	43
10/29/02	11	5	55%	53%	44
11/5/02	15	6	60%	53%	45
11/12/02	8	5	38%	53%	46
11/19/02	12	5	58%	54%	47
11/26/02	10	5	50%	54%	48

APPENDIX E9

Table Appendix E-9 Nickel Removal Rate Calculations					
Date	Nickel Influent (ppb)	Nickel Effluent (ppb)	Removal Rate	Removal Rate in Ascending Rank	Rank
12/3/02	32	6	81%	54%	49
12/10/02	13	6	54%	54%	50
12/17/02	14	5	64%	54%	51
12/25/02	8	5	38%	55%	52
1/7/03	17	5	71%	55%	53
1/14/03	13	8	38%	55%	54
1/21/03	10	6	40%	55%	55
1/28/03	13	6	54%	56%	56
2/4/03	14	5	64%	57%	57
2/11/03	11	6	45%	57%	58
2/18/03	17	5	71%	57%	59
2/25/03	20	6	70%	57%	60
3/4/03	14	5	64%	57%	61
3/11/03	12	5	58%	58%	62
3/18/03	13	5	62%	58%	63
3/24/03	14	7	50%	58%	64
4/1/03	19	6	68%	60%	65
4/9/03	20	6	70%	60%	66
4/17/03	12	6	50%	60%	67
4/25/03	8	5	38%	60%	68
5/1/03	14	6	57%	60%	69
5/6/03	14	6	57%	60%	70
5/13/03	21	8	62%	61%	71
5/20/03	10	5	50%	62%	72
5/27/03	12	5	58%	62%	73
6/3/03	16	6	63%	62%	74
6/10/03	14	7	50%	62%	75
6/17/03	9	6	33%	62%	76
6/24/03	11	6	45%	62%	77
7/1/03	16	6	63%	63%	78
7/8/03	10	5	50%	63%	79
7/15/03	7	5	29%	63%	80
7/22/03	13	5	62%	63%	81
7/29/03	9	6	33%	63%	82
8/5/03	14	5	64%	64%	83
8/12/03	11	7	36%	64%	84
8/19/03	12	6	50%	64%	85
8/26/03	11	5	55%	64%	86
9/3/03	9	5	44%	64%	87
9/9/03	10	6	40%	64%	88
9/16/03	19	5	74%	64%	89
9/23/03	18	7	61%	64%	90
9/30/03	11	6	45%	64%	91
10/7/03	14	7	50%	65%	92
10/14/03	14	7	50%	65%	93
10/21/03	10	6	40%	65%	94
10/28/03	18	6	67%	65%	95
11/4/03	17	6	65%	67%	96

APPENDIX E9

Date	Nickel Influent (ppb)	Nickel Effluent (ppb)	Removal Rate	Removal Rate in Ascending Rank	Rank
Table Appendix E-9 Nickel Removal Rate Calculations					
12/2/03	19	7	63%	67%	97
1/6/04	15	6	60%	67%	98
2/5/04	19	7	63%	67%	99
3/8/04	11	6	45%	68%	100
4/6/04	17	8	53%	68%	101
5/3/04	14	6	57%	68%	102
5/26/04	20	7	65%	70%	103
6/9/04	12	6	50%	70%	104
7/7/04	14	5	64%	70%	105
8/10/04	11	7	36%	71%	106
9/8/04	12	6	50%	71%	107
10/4/04	9	5	44%	71%	108
11/8/04	10	5	50%	74%	109
11/17/04	8.9	8.3	7%	74%	110
12/9/04	15	6	60%	81%	111

Number of Samples =   111
Median =   56%
Average =   55%

To calculate the removal rate at the 3rd decile
Rank of 3rd decile = Sample Size* (30%) = 111*(0.3) =   33.3
Used linear regression to compute the appropriate percentile

3rd Decile Effluent Removal Rate =   50%

APPENDIX E10

Table Appendix E-10		
Molybdenum Removal Rate Calculations		
Date	Molybdenum Influent (ppb)	Molybdenum Effluent (ppb)
9/1/05	19.3	
9/2/05	14.1	
9/3/05	19.7	
9/4/05	16.0	
9/5/05	22.0	
9/6/05	17.6	
9/7/05	28.8	12.1
10/3/05	14.3	
10/4/05	14.1	
10/5/05	12.9	9.4
10/6/05	14.7	
10/7/05	13.9	
10/8/05	12.8	
10/9/05	11.2	
10/10/05	12.6	
10/11/05	12.9	
10/12/05	16.3	
10/13/05	15.7	
10/14/05	16.5	
10/15/05	16.0	
10/16/05	13.4	
10/17/05	15.6	
10/18/05	13.0	
10/19/05	14.6	
11/1/05	15.6	
11/2/05	14.4	
11/3/05	12.6	
11/4/05	13.3	
11/5/05	10.8	
11/6/05	11.9	
11/7/05	12.6	7.3
Mean	15.1	9.6

Molybdenum Final Effluent Mean Efficiency Removal Rate (Mo FEMERR)
Mo FEMERR = (Mean Influent - Mean Final Effluent)/Mean Influent
Mo FEMERR = (15.1 mg/l - 9.6 mg/l) 15.1 mg/l
Mo FEMERR =   37%

APPENDIX E11

Date	Selenium Influent (ppb)	Selenium Effluent (ppb)	Removal Rate	Removal Rate in Ascending Rank Order	Rank
Table Appendix E-11					
Selenium Removal Rate Calculations					
1/2/02	1.48	0.456	69%	26%	1
2/5/02	2.08	0.643	69%	61%	2
3/5/02	1.1	0.811	26%	62%	3
4/2/02	4.67	0.57	88%	64%	4
5/7/02	2.21	0.635	71%	68%	5
6/4/02	1.6	0.485	70%	69%	6
7/1/02	1.68	0.375	78%	69%	7
8/6/02	1.45	0.32	78%	69%	8
9/3/02	1.63	0.344	79%	70%	9
10/1/02	2.39	0.361	85%	70%	10
11/5/02	4.04	0.398	90%	71%	11
12/3/02	1.74	0.465	73%	72%	12
1/7/03	2.53	0.551	78%	73%	13
2/4/03	2.15	0.526	76%	73%	14
3/4/03	2.16	0.565	74%	74%	15
4/1/03	1.64	0.517	68%	74%	16
5/6/03	2.22	0.690	69%	74%	17
6/3/03	3.05	0.713	77%	75%	18
7/1/03	2.45	0.568	77%	76%	19
8/5/03	1.69	0.43	75%	77%	20
9/3/03	1.55	0.336	78%	77%	21
10/7/03	1.53	0.404	74%	77%	22
11/4/03	1.43	0.373	74%	78%	23
12/2/03	1.55	0.363	77%	78%	24
1/6/04	1.52	0.572	62%	78%	25
2/5/04	1.91	0.737	61%	78%	26
3/8/04	2.03	0.602	70%	78%	27
4/6/04	1.96	0.706	64%	79%	28
5/3/04	2.21	0.605	73%	82%	29
6/9/04	4.56	0.429	91%	83%	30
7/7/04	2.2	0.356	84%	84%	31
8/10/04	1.43	0.316	78%	85%	32
9/8/04	0.653	0.186	72%	88%	33
10/4/04	1.946	0.329	83%	89%	34
11/8/04	3.06	0.345	89%	90%	35
12/9/04	1.83	0.327	82%	91%	36

Total Number of Samples = 36
Median = 75%
Mean = 74%

To calculate the removal rate at the 3rd decile
Rank of 3rd decile = Sample Size* (30%) = 36*(0.3) = 10.8
Used linear regression to compute the appropriate percentile

3rd Decile Effluent Removal Rate = 71%

Table Appendix E-12

Silver Removal Rate Calculations

Date	Silver Influent (ppb)	Silver Effluent (ppb)	Silver MR Effluent* (ppb)	Removal Rate	Removal Rate in Ascending Rank Order	Rank
1/2/2002	3.1	ND	0.024	99%	60%	1
2/5/2002	1.8	0.0586	0.059	97%	92%	2
3/5/2002	4	ND	0.043	99%	93%	3
4/2/2002	3.5	0.1858	0.186	95%	94%	4
5/7/2002	5	0.2387	0.239	95%	94%	5
6/4/2002	3.4	0.0665	0.067	98%	95%	6
7/1/2002	2.7	0.0637	0.064	98%	95%	7
8/6/2002	2.3	ND	0.052	98%	95%	8
9/3/2002	2.1	0.1287	0.129	94%	95%	9
10/1/2002	4	0.1844	0.184	95%	95%	10
11/5/2002	3.2	ND	0.029	99%	95%	11
12/3/2002	16.4	0.0944	0.094	99%	95%	12
1/7/2003	2.2	0.1	0.100	95%	95%	13
2/4/2003	3.2	ND	0.033	99%	96%	14
3/4/2003	3	0.2	0.200	93%	96%	15
4/1/2003	2.4	0.1	0.100	96%	97%	16
5/6/2003	4	ND	0.047	99%	97%	17
6/3/2003	2.7	ND	0.019	99%	97%	18
7/1/2003	3.3	ND	0.038	99%	98%	19
8/5/2003	14.7	ND	0.052	100%	98%	20
9/3/2003	2.2	ND	0.052	98%	98%	21
10/7/2003	1.7	0.1	0.100	94%	98%	22
11/4/2003	2	0.1	0.100	95%	98%	23
12/2/2003	0.2	0.08	0.080	60%	98%	24
1/6/2004	15.1	ND	0.052	100%	99%	25
2/5/2004	2.5	0.03	0.030	99%	99%	26
3/8/2004	1.8	ND	0.052	97%	99%	27
4/6/2004	4.6	ND	0.052	99%	99%	28
5/3/2004	2.5	0.06	0.060	98%	99%	29
6/9/2004	1.9	ND	0.052	97%	99%	30
7/7/2004	3.0	ND	0.052	98%	99%	31
8/10/2004	2.3	0.12	0.120	95%	99%	32
9/8/2004	3.1	0.14	0.140	95%	99%	33
10/4/2004	1.6	0.1209	0.121	92%	99%	34
11/8/2004	3.7	0.1663	0.166	96%	100%	35
12/9/2004	3.6	0.1648	0.165	95%	100%	36

* MR Effleunt Data contains data that estimated non-detects based on the ROS MR Method

Total Number of Samples	36
Median =	97%
Mean =	96%

To calculate the removal rate at the 3 rd decimal
Rank of 3rd decile = Sample Size* (30%) = 36*(0.3) =   10.8
Used linear regression to compute the appropriate percentile

3rd Decimile Effluent Removal Rate =   95%

APPENDIX 13

Table Appendix E-13

Zinc Removal Rate Calculations

Date	Zinc (ppb) Influent Daily Maximum	Zinc (ppb) Effluent	Removal Rate	Removal Rate in Ascending Rank Order	Rank
01/02/02	297	33	89%	61%	1
01/08/02	345	42	88%	68%	2
01/15/02	315	55	83%	70%	3
01/22/02	254	57	78%	73%	4
01/29/02	299	81	73%	74%	5
02/05/02	281	51	82%	76%	6
02/12/02	380	58	85%	78%	7
02/19/02	409	60	85%	78%	8
02/26/02	401	54	87%	78%	9
03/05/02	543	57	90%	78%	10
03/12/02	346	57	84%	79%	11
03/19/02	343	46	87%	80%	12
03/26/02	312	50	84%	80%	13
04/02/02	291	42	86%	80%	14
04/09/02	283	52	82%	80%	15
04/16/02	317	45	86%	80%	16
04/23/02	261	42	84%	80%	17
04/30/02	354	44	88%	81%	18
05/07/02	304	51	83%	81%	19
05/14/02	381	78	80%	81%	20
05/21/02	290	57	80%	81%	21
05/28/02	318	61	81%	81%	22
06/04/02	265	39	85%	82%	23
06/11/02	280	45	84%	82%	24
06/18/02	285	52	82%	82%	25
06/25/02	313	52	83%	82%	26
07/01/02	356	55	85%	82%	27
07/09/02	460	64	86%	82%	28
07/16/02	328	51	84%	82%	29
07/23/02	372	72	81%	82%	30
07/30/02	493	64	87%	83%	31
08/06/02	529	79	85%	83%	32
08/13/02	315	47	85%	83%	33
08/20/02	299	59	80%	83%	34
08/27/02	340	76	78%	83%	35
09/03/02	387	40	90%	83%	36
09/10/02	370	54	85%	83%	37
09/17/02	356	58	84%	83%	38
09/24/02	379	52	86%	83%	39
10/01/02	445	55	88%	84%	40
10/08/02	390	43	89%	84%	41
10/15/02	383	47	88%	84%	42
10/22/02	366	48	87%	84%	43
10/29/02	324	61	81%	84%	44
11/05/02	437	68	84%	84%	45
11/12/02	389	62	84%	84%	46

APPENDIX 13

Table Appendix E-13

Zinc Removal Rate Calculations

Date	Zinc (ppb) Influent Daily Maximum	Zinc (ppb) Effluent	Removal Rate	Removal Rate in Ascending Rank Order	Rank
11/19/02	313	49	84%	84%	47
11/26/02	348	73	79%	84%	48
12/03/02	421	65	85%	84%	49
12/10/02	366	64	83%	84%	50
12/17/02	318	52	84%	84%	51
12/25/02	382	61	84%	84%	52
01/07/03	570	53	91%	84%	53
01/14/03	379	57	85%	84%	54
01/21/03	402	44	89%	84%	55
01/28/03	371	59	84%	84%	56
02/04/03	401	47	88%	85%	57
02/11/03	727	58	92%	85%	58
02/18/03	612	58	91%	85%	59
02/25/03	707	51	93%	85%	60
03/04/03	407	59	86%	85%	61
03/11/03	435	53	88%	85%	62
03/18/03	327	51	84%	85%	63
03/24/03	326	47	86%	85%	64
04/01/03	319	54	83%	85%	65
04/09/03	381	58	85%	85%	66
04/17/03	307	51	83%	85%	67
04/25/03	278	55	80%	85%	68
05/01/03	348	56	84%	85%	69
05/06/03	436	55	87%	85%	70
05/13/03	338	64	81%	85%	71
05/20/03	368	51	86%	86%	72
05/27/03	452	52	88%	86%	73
06/03/03	419	47	89%	86%	74
06/10/03	406	47	88%	86%	75
06/17/03	490	59	88%	86%	76
06/24/03	331	61	82%	86%	77
07/01/03	427	66	85%	86%	78
07/08/03	391	59	85%	86%	79
07/15/03	308	120	61%	86%	80
07/16/03	316	48	85%	86%	81
07/22/03	349	31	91%	86%	82
07/29/03	347	53	85%	87%	83
08/05/03	315	45	86%	87%	84
08/12/03	302	67	78%	87%	85
08/19/03	387	71	82%	87%	86
08/26/03	355	45	87%	87%	87
09/03/03	334	74	78%	87%	88
09/09/03	373	50	87%	87%	89
09/16/03	347	54	84%	88%	90
09/23/03	568	41	93%	88%	91
09/30/03	353	53	85%	88%	92

APPENDIX 13

Table Appendix E-13

Zinc Removal Rate Calculations

Date	Zinc (ppb) Influent Daily Maximum	Zinc (ppb) Effluent	Removal Rate	Removal Rate in Ascending Rank Order	Rank
10/07/03	254	47	81%	88%	93
10/14/03	358	37	90%	88%	94
10/21/03	253	43	83%	88%	95
10/28/03	276	55	80%	88%	96
11/04/03	335	46	86%	88%	97
12/02/03	294	58	80%	88%	98
01/06/04	242	64	74%	88%	99
02/05/04	262	47	82%	89%	100
03/08/04	262	85	68%	89%	101
04/06/04	223	68	70%	89%	102
05/03/04	260	43	83%	89%	103
05/26/04	311	55	82%	90%	104
06/09/04	295	36	88%	90%	105
07/07/04	342	56	84%	90%	106
08/10/04	288	48	83%	91%	107
09/08/04	292	40	86%	91%	108
10/04/04	294	40	86%	91%	109
11/08/04	264	41	84%	92%	110
11/17/04	145	26	82%	93%	111
12/09/04	255	62	76%	93%	112

Number of Samples =   112
Median =   85%
Mean =   84%

To calculate the removal rate at the 3 rd decimal
Rank of 30 decile = Sample Size* (30%) = 112*(0.3) =   33.6
Used linear regression to compute the appropriate percentile

3rd Deciles Removal Rate =   83%

APPENDIX E14

Date	Phenolics Influent (ppb)	Phenolics Effluent (ppb)	MR I (ppb)	Phenolics Ehd**(ppb)	Removal Rate	Removal Rate in Rank Order	Rank
Table Appendix E-14 Phenolics Removal Rate Calculations							
1/2/02	16	<5	16	2.5	84%	32%	1
4/2/02	19	13	19	13	32%	76%	2
5/7/02	29	<6	29	3	90%	77%	3
7/1/02	24	<5	24	2.5	90%	84%	4
10/1/02	40	6	40	6	85%	85%	5
1/7/03	11	<5	11	2.5	77%	88%	6
4/1/03	20	<5	20	2.5	88%	90%	7
7/1/03	27	<5	27	2.5	91%	90%	8
10/7/03	33	8	33	8	76%	91%	9
3/8/04	6	<1	6	0.5	92%	92%	10
9/8/2004***	<25	<1	11	0.5	NA	NA	NA

* Replaced Influent Non-Detects with Calculated ROS/MR Method Values

** Replaced Effluent Non-Detects with 1/2 detection limit

*** Did not calculate removal rate for influent/effleunt non-detected pair.

Total Number of Samples	10
Median =	86%
Mean =	80%

To calculate the removal rate at the 3rd decile

Rank of 3rd decile = Sample Size* (30%) = 10*(0.3) =   3

X = 3rd decile removal rate

No regression needed since 10 samples

3rd Decile Effluent Removal Rate =   77%

APPENDIX F

Table F-1 presents activated sludge inhibition criteria and and the corresponding activated sludge AHLs discussed in Section 5.6..

The equation below was used to calculate the water quality based AHL.

$$WQAHL = \frac{8.34 \times C_{wqc} \times Q_{avg} \times (1-SF)}{(1-3rdERR)}$$

Where:

WQAHL = AHL based on water quality criteria (ppd) (column 5)

Cwqc = monthly average POC water quality criteria (mg/L) (column 2)

8.34 = unit conversion factor.

Qavg = influent average annual flow (mgd) = **116.6**

SF = safety factor (10%)

3rdERR = third decile effluent removal rate for each POC (column 3)

Table Appendix F-1 Water Quality POC Criteria and AHL Calculation Results				
POC [1]	Water Quality POC Criteria (ug/l) [2]	Source [3]	3rd Decile Effluent Removal Rate [4]	Water Quality MAHL [5]
Antimony	4300	CTR	0%	3760
Arsenic	36	CTR	53%	67
Berylium	100	CTR	55%	194
Cadmium	7.3	CTR	71%	22
Chromium (Total)	200	CTR	89%	1590
Copper	12	NPDES Permit	97%	350
Cyanide	1	CTR	0%	0.88
Lead	8.52	CTR	88%	65
Manganese	200	CTR	98%	9310
Mercury	0.012	NPDES Permit	99%	0.92
Nickel	25	NPDES Permit	50%	44
Selenium	5	CTR	71%	15
Silver	2.24	CTR	95%	43
Zinc	170	CTR	83%	880
Total Phenol	4600000	CTR (Phenol)	77%	18000000

APPENDIX G

Table G-1 presents activated sludge inhibition criteria and and the corresponding activated sludge AHLs discussed in Section 5.6..

The equation below was used to calculate the activated sludge inhibition AHL.

$$ASIAHL = \frac{8.34 \times C_{ASI} \times Q_{avg} \times (1 - SF)}{(1 - PRR)}$$

Where:

ASIAHL	=	activated sludge inhibition AHL (ppd) (Column 6)
C_{ASI}	=	activated sludge inhibition Limit Concentration (mg/L) (Column 4)
Q_{avg}	=	Plant's average flow rate (mgd) = 116.6
PRR	=	primary removal rate (Column 5)
SF	=	safety factor = 10 %
8.34	=	conversion factor

Table Appendix G-1
Activated Sludge POC Criteria and AHL Calculations

POC [1]	Activated Sludge Inhibition Threshold Levels, mg/l			Primary Removal Rate [5]	Activated Sludge AHL (ppd) [6]
	Min [2]	Max [3]	POC [4]		
Arsenic	0.1	0.1	0.1	0%	88
Cadmium	1	10	1	15%	1000
Chromium (Total)	1	100	1	27%	1200
Copper	1	1	1	43%	1500
Cyanide	0.1	5	0.1	27%	120
Lead	1	5	1	57%	2000
Mercury	0.1	1	0.1	10%	97
Nickel	1	2.5	1	23%	1100
Zinc	0.3	5	0.53	27%	640
Phenol	50	200	50	8%	47600

APPENDIX G

Table G-2 presents activated sludge inhibition criteria and and the corresponding activated sludge AHLs discussed in Section 5.6..

The equation below was used to calculate the nitrification inhibition AHL.

$$NIAHL = \frac{8.34 \times C_{NI} \times Q_{avg} \times (1 - SF)}{(1 - PRR)}$$

Where:

NIAHL =   nitrification inhibition AHL (Column 5) (ppd)

C_{NI} =   nitrification inhibition limit concentration(Column 6) (mg/L).

Table Appendix G-2
Nitrification POC Criteria and AHL Calculations

POC [1]	Range of Nitrification Inhibition Threshold Levels, mg/l			Primary Removal Rate [5]	Nitrification AHL ppd [6]
	Min [2]	Max [3]	POC [4]		
Arsenic	1.5	1.5	1.5	0%	1300
Cadmium	5.2	5.2	5.2	15%	5400
Chromium (Total)	0.25	1.9	0.25	27%	300
Copper	0.05	0.48	0.15	43%	240
Cyanide	0.34	0.5	0.34	27%	410
Lead	0.5	0.5	0.5	57%	1000
Nickel	0.25	0.5	0.25	23%	280
Zinc	0.08	0.5	0.53	27%	640
Phenol	4	10	4	8%	3800

APPENDIX G

Table G-3 presents activated sludge inhibition criteria and and the corresponding activated sludge AHLs discussed in Section 5.6..

The equation below was used to calculate the anaerobic digestion inhibition AHL.

$$ADIAHL = \frac{8.34 \times C_{ADI} \times SQ_{avg} \times (1 - SF)}{(BSERR)}$$

Where:

ADIAHL = anaerobic digester inhibition AHL (column 6)(ppd).

C_{ADI} = anaerobic digester inhibition standard concentration (column 4) (mg/L).

SQavg = Plant average sludge flow rate to digestors (0.84 mgd)

BSERR = biosolids effluent removal rate (column 4)

Table Appendix G-3

Anaerobic Digester POC Criteria and AHL Calculations

POC [1]	Range of Anaerobic Digestion Inhibition Threshold Levels mg/l			Biosolids Effluent Removal Rate [5]	Anaerobic Digestr AHL ppd [6]
	Min [2]	Max [3]	POC [4]		
Arsenic	1.6	1.6	1.6	55%	18
Cadmium	20	20	20	81%	160
Chromium (Total)	110	110	110	89%	780
Copper	40	40	40	97%	260
Cyanide	1	100	1	100%	6.3
Lead	340	340	340	90%	2400
Nickel	10	136	10	55%	110
Silver	13	65	13	96%	85
Zinc	400	400	400	84%	3000

APPENDIX H

Table H-1 presents biosolids concentration criteria and the corresponding biosolid-based AHLs discussed in Section 5.6..

The biosolid-based AHLs were calculated using the lowest dry solids biosolids criteria from the following sources:

"Clean Sludge" Pollutant Concentration Limits from Table 1 (Ceiling Concentrations) in 40 CFR 503.13 (1995) (Column 4),

"Clean Sludge" Pollutant Concentration Limits from Table 3 (Monthly Average Pollutant Concentrations) in 40 CFR 503.13 (1995) (Column 3),

Surface disposal limits for an active surface disposal site from Tables 1 and 2 in 40 CFR 503.23 (1995) (Column 2)

California Hazardous Waste Total Threshold Limit Concentration (TTLC) from Title 22, Division 4.5, Chapter 11, Article 3, §66261.24 (Column 5)

To convert the TTLC from wet tons to dry tons, the TTLC wet weight was divided by the percentage of solids to wet sluge (% solids). The average percent solids for Plant biosolids is 72% as shown in Table H-2

Table Appendix H-1
Biosolids Criteria and BSAHL Results

Constituent [1]	Land Application Monthly Average (mg/kg) [2]	Disposal Sludge 0-25 ft from active biosolids Unit		California TTLC Wet Weight (mg/kg) [5]	California Dry Weight TTLC Dry Weight (mg/kg) [6]	Lowest Sludge Dry Weight Criteria (mg/kg) [7]	BSERR [8]	BSAHL (ppd) [9]
		Monthly Average (mg/kg) [3]	Ceiling Concentration (mg/kg) [4]					
Antimony	-	-	-	500	700	700	100%	160
Arsenic	41	30	75	500	700	30	55%	13
Beryllium	-	-	-	75	100	100	55%	43
Cadmium	39	NA	85	100	140	39	81%	11
Chromium	-	200	-	2500	3500	200	89%	100
Copper	1500	-	4300	2500	3500	1500	97%	400
Lead	300	-	840	1000	1400	300	90%	80
Mercury	17	-	57	20	28	17	99%	4.0
Molybdenum	-	-	75	3500	4900	75	37%	48
Nickel	420	210	420	2000	2800	210	55%	90
Selenium	100	-	100	100	140	100	74%	32
Silver	-	-	-	500	700	700	96%	170
Zinc	2800	-	7500	5000	7000	2800	84%	800

Column 7 presents the lowest dry weight criteria selected for biosolid-based AHL calculation (Column 9).

Table Appendix H-2

Plant's Biosolids Annual Quantity and Percent Solids					
Stockpile	**Year Stockpiled**	**Year Reused**	**Biosolids (dry tons per year)**	**Biosolids (wet tons per year)**	**Average Percent Solids**
B-2002	2002	2003/2004	56489	77726	73%
B-2003	2003	2004	39635	55824	71%
Average			**48062**	**66775**	**72%**

The equation below was used to calculate the biosolids-based AHLs:

$$BSAHL = \frac{0.0022 \times C_{BS} \times Q_{BS}}{BBERR} \times (1 - SF)$$

Where:

BSAHL =   AHL based on biosolids criteria - column 9 (ppd)

C_{BS} =   lowest biosolids dry weight criteria (column 7) biosolids or sludge standard dry weight (mg/kg).

Q_{BS} =   biosolids disposal rate (dry metric tons per day) =   119

BBERR =   biosolids-based effluent removal rate (column 8)

SF =   safety factor = 10 %

0.0022 =   conversion factor.

APPENDIX I

Tables Appendix I-1 and I-2 provide the xylene exposure criteria applicable for Xylene.

The lowest criteria was the O-Xylene Health and Safety Criteria for Fume Toxicity of 1400 ppb. This value was used to calculate the MAHL for Xylene.

Table Appendix I-1						
Health and Safety Xylene Fume Toxicity Data						
Xylene	**Exposure limit (ppm)**	**Conversion Factor (mg3/mg per ppm)**	**Exposure Limit (mg/m3)**	**Henry's Law Constant (mg/m3 per mg/L)**	**Discharge Screening Level (ppb)**	**Source of Exposure Limits**
M&P Xylene	100	4.35	435	218	2000	PEL-TWA
O-Xylene	100	4.35	435	319	1400	PEL-TWA

The Health and Safety Lower Explositivity Limits calculations used the following equations to develop the LEL in ppb.

LEL% = Lower Explositivity Limit Percent by Volume
LEL% Vol/Vol = LEL% mole/mole
LEL mole/m3 = LEL% mole/mole X 0.408 mol air/m^3 air (column 2)
LEL mg/l = LEL mol/m3/Henry''s Law Constant (column 3)

Table Appendix I-2						
Health and Safety Xylene Explositivity Data						
Xylene	**LEL % Vol/Vol**	**LEL mol/m3**	**Henry's Law Constant (mol/m3)/(mg/L)**	**MW (g/mol)**	**LEL (mg/l)**	**10% of LEL (ppb)**
M&P Xylene	0.9	0.37	2.05E-03	106.2	1.789E+02	18000
O-Xylene	0.9	0.37	3.00E-03	106.2	1.224E+02	12000

APPENDIX I

Tables Appendix I-1 and I-2 provide the xylene exposure criteria applicable for Xylene.

The MAHL was calculated based on 0% Removal Rate since the MAHL has to be applicable at the influent. The following equation was used to calculate the MAHL

$$\text{HSAHL} = \frac{8.34 \times \text{C}_{\text{HS}} \times \text{Q}_{\text{avg}}}{(1-0)} \times (1-\text{SF})$$

$$\text{HSAHL} = \frac{8.34 \times 1.4\,\text{mg/l} \times 116.6}{(1-0)} \times (1-10\%)$$

HSAHL = 1200 ppb